

THE IRON AGE

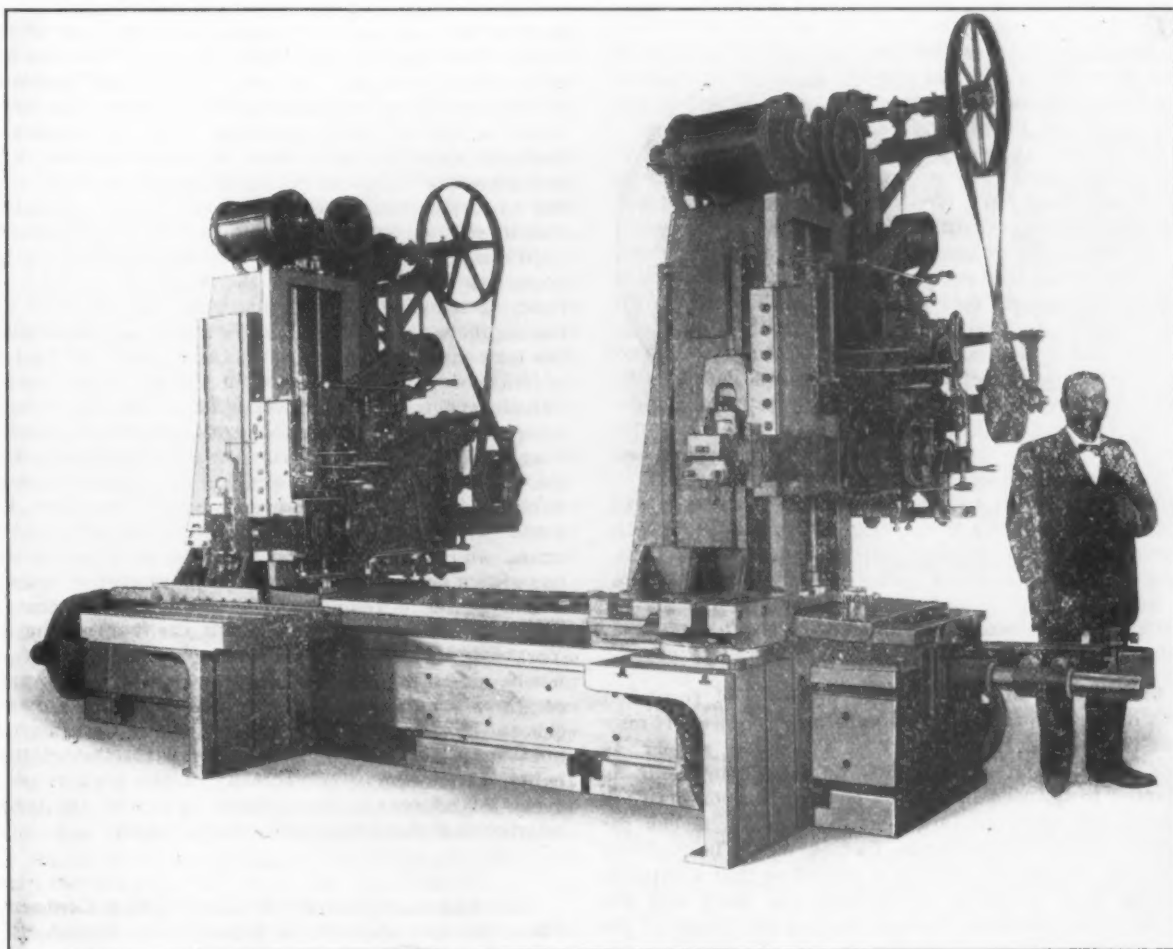
THURSDAY, OCTOBER 2, 1902.

The Morton Double Traveling Head Shaper.

The shaper built by the Morton Mfg. Company of Muskegon Heights, Mich., embodies several new features. It is built on the principle of the drawing cut, with steel ram, heads and main driving gear, and is constructed with a heavy bed which is ribbed and cross ribbed, and on this bed rests the vertical column, which is suitably fitted and gibbed. The movement of the column on the bed is obtained by a screw, which remains stationary, the nut revolving. The apron is gibbed and fitted to the vertical column and the vertical adjusting screw is also stationary, being operated with

movements. The reciprocatory motion of the ram is obtained by two friction clutches, one being operated by an open belt and the other by a cross belt. It has a quick return stroke of three to one.

It is also provided with a coil spring counterbalance, shown in Fig. 2, for the vertically moving apron. This consists of a frame, A, in which is journaled the shaft B, and to which is also attached and journaled the shaft C. On the end of the shaft B is the chain sheave D, which is made large enough to require only a part of a revolution to accomplish its work. On the other end of the shaft B is a gear, E, which engages the pinion keyed to the shaft C. Journaled on the frame is also



THE MORTON DOUBLE TRAVELING HEAD SHAPER.

a revolving nut. These revolving nuts are fitted with ball bearing thrust collars.

The ram is square and has a bearing on all four sides, wear being taken up with taper gibs. The stroke is adjusted by tappets on a circular disk and a suitable lever is provided whereby it may be reversed at any part of the stroke.

The machine has automatic feeds in both directions and is also provided with means whereby it may be moved by power, either vertically or horizontally, for purpose of adjustment. The countershaft is provided with a friction clutch and is stopped and started instantly at any part of the stroke by means of a lever provided for this purpose, rendering the machine under complete control of the operator. The friction feed is of the automatic relieving type and is positive in its

a drum and casing, F, the ends of which are provided with a ratchet. Connected to the shaft C are several heavy spiral clock springs. The outer coil of these springs is connected to a suitable casing, which fits loosely in the drum G and is driven and controlled by the lug H.

It will be readily seen that the inner end of the heavy springs being attached to the shaft C, and the outer end being attached to the spring casing, and being driven by the lug H, that when the load is varied and the apron of the machine moved up and down on the column the shaft C is made to revolve in either direction. The drum F may be revolved in the direction in which the pawl will allow until sufficient tension or counterbalance is produced. The shaft C being only required to make three revolutions in order to give

the necessary movement to the saddle or apron on the column, as the column descends the tension on the springs increases somewhat, and as the apron is raised on the column the springs unwind. The drum under all circumstances during these operations remains stationary.

This form of a counterbalance has proven satisfactory where the distance to be adjusted vertically is not too great.

One commendable feature of this shaper which differs from any other is that of the vertical feed on the column, which enables the machine to take vertical side cuts and makes it well adapted for internal work. The head may be removed and a special head secured to the end of the ram so that internal slotting may be accomplished with this tool. Both heads feed independently of each other and obtain their feeding power with revolving nuts from the same screw.

The machine is electrically driven, each head being driven independently of the other, so that either one may be brought into action and operated.

This shaper has 36-inch stroke, 30 inches vertical feed on the column, and the length of the bed is 14 feet. It

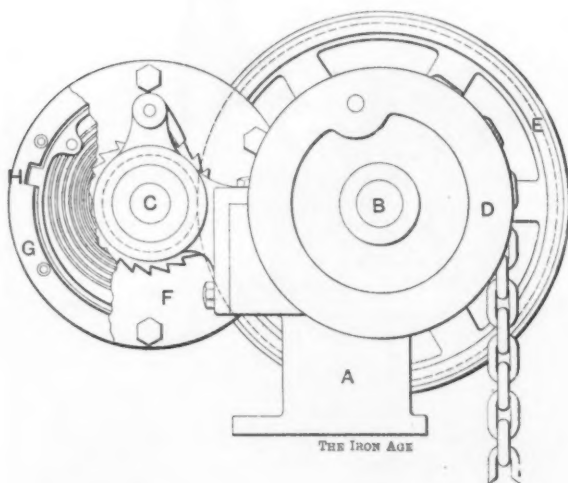


Fig. 2.—Coil Spring Counterbalance.

THE MORTON DOUBLE TRAVELING HEAD SHAPER.

is built either single or double headed and furnished with one or two tables, as the case may require. It may also be used in the capacity of a portable shaper, as with the vertical adjustments on the column it is adapted to be used in connection with a floor plate, in planing off spots on large castings, pillow blocks for medium sized Corliss engine frames, &c. The plate on the front side of the column is planed so that a suitable bearing may be placed in between the work and the frame of the machine, thereby placing the thrust of the cut directly against the column. It is very heavily geared and capable of taking a cut $1\frac{1}{4}$ inches deep in steel with 1-16-inch feed. When desired it can be constructed with tables made to raise and lower for purposes of adjustment.

One particular advantage of this style of shaper is that one head can be operated on a piece of work 30 inches above the table, while the other head may be operated at any intermediate point.

In machining the opening in a solid end connecting rod the end is held in a suitable adjustable chuck and a support is placed between the top of this chuck and the column of the shaper. This allows the machine to be fed vertically or horizontally, and when machining the opening a cut may be taken across the bottom, then the head turned 45 degrees and a cut taken up the side. It can then be changed and a cut taken across the top and another change made and a cut taken down the end. This enables the opening of a connecting rod to be planed out on all four sides, the rod remaining in a stationary position. With the automatic feeds on the

column and the range which this shaper has a great deal of irregular work can be done which has heretofore been difficult to reach with any tool.

The Scheme to Deepen the Great Lakes.

The vessel interests of the great upper lakes, as well as all other interests that are influenced by the transportation possibilities on these bodies of water, will watch with close attention the development and transactions of the International Commission to be appointed, in pursuance of an act of Congress, as set forth in a clause of the River and Harbor bill. In carrying out the purpose of Congress, Assistant Secretary Adey has formally invited the Government of the Dominion of Canada, through the British Embassy, to name commissioners to co-operate with a similar commission to be appointed by the United States.

This joint commission will investigate and report upon the conditions that govern the levels of the lakes and will take into consideration also the advisability and necessity of constructing a dam at the foot of Lake Erie and entrance to the Niagara River in order that the level of the lakes may be raised. The building of such a dam has long been advocated by engineers who have given attention to the important subject, and the doings of the commissioners cannot fail to be of vast importance to the industrial interests of many sections. If the dam is constructed it must be an international work, and therefore the co-operation of the Dominion is essential to its success. The plan is one of such magnitude that it will require the utmost care in its consideration.

While the primary object is to increase the depth of water at necessary points, there are so many things likely to result from the construction of the work that the engineering problem is a large one. In many places the lake shore is very low, and any increase in the height of water will result in flooding large areas, both in Canada and the United States. Then, the industrial development that has attained great magnitude between Niagara Falls and the lake demands consideration, while the preservation of the beauty of the Niagara cataract likewise demands attention. Especially has New York State expended large sums to retain the glory of Niagara, and since this work has been in progress there has grown up the equally important interest of the wonderful power development. It is understood that the plan is to construct a canal about the dam on the New York side in order that the commerce of the river may not be interrupted, and, of course, there would be a flow of water over any dam that might be built. However, the question is one which is likely to be influenced but not wholly governed by necessities of the immediate locality, as the extensive necessity of the harbors on the great inland seas is the primary object of the present international movement and consideration.

The American Foundry & Construction Company.—

The American Foundry & Construction Company, organized in Pittsburgh some months since have about completed their works in Hazlewood in that city. The plant includes a machine shop, iron foundry, pipe bending equipment and blacksmith shop. The entire plant is equipped with the latest improved appliances for the manufacture of machinery and castings for blast furnaces, rolling mills and steel works, as well as valves, fittings, pipe bending and high pressure piping. The machine shop is 80 x 150 feet, of gallery construction. The lower floor is exclusively for machine work, while the gallery is used as a pattern making and storage department. The foundry is 85 x 105 feet, and contains a 20-ton cupola and two electric traveling cranes. The pipe department is 85 x 85 feet. Power is supplied by a 200 horse-power engine and two 150 horse-power boilers. The officers of the company are: Jeremiah Miller, president; H. E. Weiskopf, secretary and treasurer, and G. E. Klingelhofer, general manager. G. E. Klingelhofer was connected for some time with the Pittsburgh Valve, Foundry & Construction Company, but left that company to organize the new enterprise.

The Suppression of Smoke in Steam Plants Using Bituminous Coal.*—I.

BY ALBERT A. CARY, NEW YORK.

It is not the intention of this article to illustrate and describe the many smoke suppressing devices on the market, as one has merely to consult the pages of the technical and trade papers to find these fully advertised, and from such directions one may learn the names and addresses of the makers of these various devices and send for as many descriptive catalogues as he pleases.

I propose to first discuss the theory of smoke suppression as simply as possible (which subject is almost inseparable from a consideration of fuel economies) and then make use of this information in the further discussion of various methods of firing and furnace developments, and finally give short descriptions of a number of special hand fired furnaces designed to suppress smoke and promote fuel economy. As far as possible I will illustrate old devices which are not protected by patents and therefore open to common use.

It is further hoped that this article will not only help the reader who has not heretofore made a study of this subject to understand the principles involved in the so-called modern smoke suppressing devices, but enable him to group them readily into a few classes, which is the first step toward a consideration of their relative merits.

The smoke nuisance from boiler furnaces can be almost entirely avoided by the adoption of proper furnaces adapted to the fuel used and by the employment of a sufficient amount of intelligence to properly handle the fires. I write thus positively after a number of years' experience in burning all kinds of fuel in various sections of the country, and I may add that I have frequently been called upon to comply with various smoke ordinances in certain Western cities, and have never found any difficulty in attaining the required results when I could obtain a reasonable amount of co-operation from the owners and operators of these plants.

The whole secret of burning fuel smokelessly is to obtain complete combustion in the furnace and combustion chambers before any appreciable amount of the combustible gases meets the chilling water surfaces of the boiler. Such practice will always secure the highest results in fuel economy, and therefore should receive the careful consideration of all steam plant owners.

Anthracite coal may be easily burned in almost any kind of furnace without smoke, simply because it is (aside from its ash) almost a pure carbon (like coke or charcoal), and it carries little volatile hydrocarbonaceous matter. Of course anthracite furnaces must be carefully designed to obtain economy of fuel, aside from the matter of smoke production. Carbon (C), when sufficiently heated in contact with oxygen, burns directly from the solid state without smoke to carbon monoxide (CO) when the supply of air is limited or to carbon dioxide (CO₂) when the supply of air is ample. The burning of C to CO is known as imperfect or incomplete combustion.

Bituminous and semi-bituminous coals carry, besides "fixed carbon," more or less "volatile" or hydrocarbonaceous matter, and those carrying the highest percentage of hydrocarbons are the greatest producers of smoke. The hydrocarbons found in coal must first pass into a gaseous state before they can be burned, and this gas is distilled off from the coal when it is thrown on the hot bed of fire in the furnace. It is generally known that combustion ceases when gases are chilled below a certain critical temperature; hence it is necessary to maintain a temperature above this critical degree in order to secure the combination of a proper amount of oxygen (from the air) with the gas just formed to produce complete combustion.

When the hydrocarbon gases are distilled off from bituminous coal we have remaining the coke which contains the ash. The coke continues its combustion the same as anthracite coal, as described above, and forms a hot fire bed on which additional coal can be thrown and have its hydrocarbon gases distilled off.

Marsh gas (CH₄) is one of the most important hydro-

carbons distilled from bituminous coal, and as all of the hydrocarbon gases behave similarly in the furnace let us see what results when this gas combines with oxygen.

For complete combustion, 4 parts of oxygen (obtained from the air) combine chemically with 1 part of the marsh gas, thus:



and the result of this chemical combination is, as just shown, 1 part of carbon dioxide (or, as it is frequently called, "carbonic acid") and also 2 parts of water, which of course appears as superheated steam.

The conditions necessary for maintaining this complete combustion are: 1, That sufficient oxygen be supplied and thoroughly mixed with the gas; 2, that the combustion takes place in a very hot chamber or furnace.

As long as such a perfect condition of combustion continues no smoke will be produced, but as soon as there is an insufficient supply of oxygen available, or when the gases drop below the critical temperature of combustion, smoke appears. This drop of temperature will occur when the unconsumed gases from the furnace come in contact with the boiler parts containing water; hence the reason for my statement above, that for smokeless results the combustible gases must be completely consumed in the fire box and combustion chamber of the boiler. The influx of a considerable amount of cold air into the furnace will lower the temperature of the unconsumed gases and generally produce smoke, as will also the delivering of a large amount of coal on the bed of the fire, which coal must be heated to the temperature of the fire bed. Further chilling effects are produced after fresh coal is added to the fire by the abstraction of heat from the hot fire bed necessary to distill off the hydrocarbon gases, and further, to evaporate any moisture that may be contained in the fuel. Therefore, it is desirable to use, in firing, only a small amount of coal for each charge, and also to distribute it well over the bed of fire, so that a great amount of chilling will not occur in any one spot. It is also desirable to use as dry a coal as possible.

Throwing large quantities of coal on the bed of the fire chokes the air spaces between the particles of fuel and prevents the free passage of air drawn through the grate and fuel bed by the chimney draft. Too great a supply of air will, of course, produce a chilling and diluting effect and produce smoke, if it is cold (as stated above), and therefore the supply of air must be carefully regulated.

Conditions of Incomplete Combustion.

With the above facts before us, let us see what occurs when conditions of incomplete combustion exist.

When the combustible gases are chilled by coming in contact with the comparatively cold boiler parts or with cold air, &c., their temperature is lowered, and in case they fall below their critical temperature of combustion the combustible gases will either pass off unconsumed or else be partially consumed, if combustion has already begun. In the former case nearly all the heat that has been expended to distill these gases from the coal is wasted. Generally a partial combustion follows such conditions, and this also occurs when an insufficient air supply exists.

After hydrocarbon gases are distilled from the coal the hydrogen they contain will eagerly seize any oxygen it may come in contact with, and combining will thus form water; and next the carbon, if at a sufficiently high temperature, will unite with what oxygen may be left. If it fails to find any oxygen (after the hydrogen has been satisfied), or if the temperature has dropped too low, the carbon will appear in little floating masses of "soot," and these particles may become heated to redness or even to incandescence, and then we will see in our furnace a red or yellowish mass of flame or a pure white opaque flame. Unless the particles of carbon are consumed before entering the fire tubes or the boiler flues or coming in contact with the water tubes we have our troublesome smoke condition. In other words, for smokeless combustion the flame must end before it comes in contact with the boiler surfaces.

Smoke, generally speaking, is simply a "cloud" of

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steam (formed as just described), more or less condensed, carrying with it little particles of unconsumed carbon, which gives it its more or less black appearance, according to the amount of carbon present. If we were able to catch all of this carbon and burn it we would have very little heat produced to pay us for our trouble compared with that obtained from the original coal, but this is not the proper place to look for a saving under these conditions, as will be shown later.

It may be that after the hydrogen in our fuel has been satisfied with sufficient oxygen to convert it into water the carbon will find a limited supply of oxygen still present, but enough to burn it to carbon monoxide. If all the carbon can be converted to carbon monoxide (as is very seldom the case under these conditions) no smoke will result, but a considerable loss of the available heating value of the carbon will occur, due to this incomplete combustion, as will be shown later.

When fresh, moist coal is charged upon a hot fire bed, after sufficient heat has been abstracted to convert the moisture into steam, the water present (H_2O) may be split up (if it can be sufficiently heated) into two separate gases (i. e., H_2 and O). The oxygen may then combine with the carbon it finds present (i. e., $C + O = CO$), and thus form water gas, expressed by the formula $CO + 2H$. This decomposition of water is a chilling process. It robs the furnace of just as much heat as would be regained if the hydrogen generated were afterward burned so as to reproduce steam. This chilling of the furnace by the decomposition of the water contained in moist fuel is a most important cause of the formation of smoke. If this gas be not chilled (as it frequently is at this critical period by the admission of considerable cold air over the top of the fire) a further combustion will take place, productive of considerable heat; the added oxygen forming carbon dioxide ($CO + O = CO_2$) and also water ($2H + O = H_2O$).

"Fixed carbon" is thus named in contradistinction to the carbon that is chemically combined with hydrogen forming the hydrocarbons. As stated above, the fixed carbon, which composes the greater part of anthracite coal and coke, when sufficiently heated in the presence of oxygen burns directly from the solid fuel into carbon monoxide (CO), or carbon dioxide (CO_2). This statement may be somewhat modified on account of the carbon monoxide (CO), which is a gas, combining later with more oxygen and forming carbon dioxide, thus: $CO + O = CO_2$.

Frequently, with a bed of fire of considerable depth, carbon dioxide (CO_2) will be formed in the lower part of the bed, and as it rises through the upper layers of coal or coke it will give up part of its oxygen to the highly heated carbon it finds, and in this way it will leave the fire bed with its newly found associate as carbon monoxide. This may be expressed thus: $CO_2 + C = 2CO$. The formation of this CO is also a cooling process. It abstracts more than two-thirds of the heat originally generated by the burning of the C to CO_2 . If the monoxide thus formed is chilled below the critical temperature of combustion by coming in contact with the

water surfaces of the boiler or with cold air, or loses sufficient temperature in any of the other chilling ways described above, it will leave the boiler with the production of less than one-third of the amount of heat that would result from its complete combustion to carbon dioxide.

When carbon monoxide is formed direct from the hot bed of "fixed carbon" it will be found that there is an insufficient air supply.

Thus it is seen that for the sake of both economy and smokeless combustion a careful regulation of the air supply is most necessary, and especially any supply of cold air that may be admitted over the top of the bed of fire.

Smokeless combustion is frequently obtained at the cost of economy by the admission of too much air to the furnace, and although the absence of smoke is very often the sign of desirable furnace conditions it is not always safe to trust this as a true index to economy.

When smoke is suppressed by the application of special furnaces or stokers an analysis of the discharged flue gases should be made before the value of the apparatus is passed upon, and with modern methods for testing flue gases this has become a comparatively simple procedure in the hands of an experienced man.

Ignition Temperatures.

The critical temperature of combustion for various substances, which has been referred to a number of times, is a most important subject, which has received altogether too little attention by those interested in furnace development, smoke suppression and fuel economy. Concerning this critical temperature of combustion, which may more scientifically be termed the ignition temperature, I cannot do better than quote from Harry C. Jones' "Elements of Physical Chemistry," as follows:

"There are many (chemical) reactions which take place with an appreciable velocity only above a certain temperature. Below this temperature the reaction apparently does not take place at all. This temperature at which the reaction begins is known as the ignition temperature. . . . Just as there is a temperature at which many reactions apparently begin, so there is a pressure at which some reactions between gases and other substances apparently commence to take place.

"Temperature and pressure, however, apparently act in opposite senses, increase in temperature increasing the velocity of the reaction, while decrease in pressure increases the velocity of the reaction. That pressure at which a reaction begins with an appreciable velocity is known as the ignition pressure, and with a lower pressure the reaction proceeds with a still greater velocity. Thus a mixture of hydrogen and oxygen has its ignition temperature lowered from 1148 to 1004 degrees F. by reducing the pressure from 760 to 360 mm. (which former pressure corresponds to the normal atmospheric pressure—viz., 14.7 pounds—while the latter pressure corresponds to 7 pounds).

The following table of critical temperatures of combustion will be found useful for reference:

Table of Temperatures of Ignition Under Atmospheric Pressure.—viz., 14.7 Pounds Per Square Inch. (In Degrees Fahrenheit.)

	Authorities						
	Vivian Lewes. Deg.	W. S. Hutton. Deg.	Victor Meyer. Deg.	Mallard & Chateller. Deg.	French commission. Deg.	Mayer & Munich. Deg.	C. E. Stromeyer. Deg.
Two parts of hydrogen (H) combining with one part of oxygen (O) forming water ($H_2 + O = H_2O$).....	....	....	1,130	1,031	1,071	....	....
One part of marsh gas (CH_4) combining with four parts of oxygen (O) forming one part of carbon dioxide and two parts of water ($CH_4 + 4(O) = CO_2 + 2(H_2O)$).....	....	....	1,313	1,202	1,436	1,233	1,200
One part of olefant gas (C_2H_4) combining with six parts of oxygen (O) forming two parts of carbon dioxide and two parts of water ($C_2H_4 + 6(O) = 2(CO_2) + 2(H_2O)$).....	....	....	....	....	1,022	....	....
Two parts of sulphur (S) combining with four parts of oxygen (O) forming two parts of sulphurous anhydride ($S_2 + 2O_2 = 2SO_2$) .....	....	....	....	....	....	....	470
One part of carbon monoxide (CO) combining with one part of oxygen (O) forming carbon dioxide ($CO + O = CO_2$).....	....	....	....	1,211	1,202	....	1,211
The above combination ($CO + O = CO_2$) requires a higher ignition temperature in the presence of a large quantity of carbon dioxide (CO_2)—viz:.....	....	....	....	....	1,292	....	....
Cannel coal ignites at.....	668	....	....	....	....	....	....
Bituminous coal ignites at.....	766	....	....	....	....	....	....
Semibituminous coal ignites at.....	870	....	....	....	....	....	....
Anthracite coal ignites at.....	....	925	....	....	....	....	....

The temperatures of ignition of coal given in the table are approximately correct for solid lumps of small size. There is some little difficulty in giving proper values for ignition temperatures of solids, as these temperatures will vary more or less with the physical condition of the material. Thus oxidation will take place with much less rapidity in a large, compact solid substance than it will with the same substance reduced to a fine powder, loosely scattered. This is largely due to the much greater surface presented to the oxygen present, which facilitates rapid chemical combination, and a somewhat lower temperature is found adequate to complete such ignition.

Few, if any, solid substances present so great a range of ignition temperatures as carbon, which occurs in many different forms, such as the diamond, graphite and charcoal. The ignition temperature of carbon in the form of the diamond is very high. As it has been burned on platinum without fusing the platinum its temperature is somewhat below the melting point of this metal, which is 3227 degrees F.

I have found no reliable data concerning the ignition temperature of carbon in the form of graphite. There is no doubt that this temperature is less than that required to chemically combine oxygen with carbon in the form of diamond, but the ignition temperature is nevertheless very high, as we may infer from the extensive use of graphite for the manufacture of crucibles for use in highly heated furnaces, and also for furnace linings where very high temperatures occur.

There is a sharp contrast between the high ignition temperatures of these two forms of carbon and the third form mentioned—that is, charcoal, which is nearly pure carbon containing but a few per cent. of impurities.

The ignition temperatures of all charcoal are not the same, varying according to its density (there being both hard and soft charcoal), which difference is due to the kind of wood used in its preparation and also the temperature existing in the charcoal furnace when it was formed.

Professor Thurston, in his "Materials of Engineering," Vol. I, page 184, gives a table of ignition temperatures for charcoal, as follows:

Temperatures of preparation. Degrees F.	Temperatures of Ignition. Degrees F.
3,000	2,500
2,500	1,300
2,000	1,100
1,500	900
1,000	800
500	650

We will see that the specific gravity of the substance (which is a measure of its density) has a material effect on its ignition temperature. Taking the above named forms of carbon and including with them anthracite coal (which runs from 92.5 to 97 per cent. of pure carbon aside from its ash), and also taking coke, which aside from its ash is within a very few per cent. of pure carbon, and considering their specific gravities, we have the following interesting table:

Substance.	Average specific gravity.	Approximate Ignition temperature. Degrees.
Diamond, in small chips.....	3.53	about 2,900
Graphite, reduced to small flakes.....	2.5	possibly 2,700
Hard charcoal.....	about 2	2,500
Connellsville coke.....	1.875	about 1,500
Anthracite coal.....	1.43	925
Soft charcoal.....	about 1.3	650

The specific gravity in the above table for coke and charcoal is the actual and not the apparent specific gravity (which is considerably less than the actual, due to air being inclosed in the pores).

This table, unfortunately, due to lack of sufficient data, is a very rough approximation, but is sufficient to show that the temperature of ignition of solids is governed by the state of density in which they exist.

The ignition temperatures given above must not be confused with the temperatures resulting from combustion. These latter temperatures are always much higher, as may be seen by consulting the following table:

Theoretical Temperature of Combustion of Various Substances in Air.

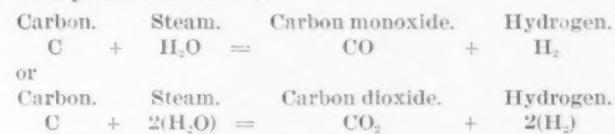
	Degrees F.
Hydrogen	4,935
Carbon to carbon dioxide.....	4,920
Marsh gas.....	3,536
Olefiant gas.....	3,704

It will be seen from the table of temperatures of ignition that if ample free hydrogen is liberated in the furnace (which is seldom the case) it will not be necessary to maintain a temperature in the combustion chamber much above 1130 degrees F., which will ignite the hydrogen present and produce sufficient intensity of heat to ignite the other accompanying combustible gases, but should little or no free hydrogen be contained in the combustible gases, and if they consist, as they do in burning bituminous coal, largely of marsh gas, a temperature of over 1436 degrees F. should be maintained until the combustion is completed.

With anthracite coal, where the principal combustible gas found in the combustion chamber is carbon monoxide (mixed with carbon dioxide), a temperature should be maintained of over 1292 degrees F.

Where there is considerable moisture present in the coal of the boiler furnace there is less likelihood of its being split up into its component elements (oxygen, and hydrogen, which requires a temperature of about 2900 degrees F.*) than there is for its combining with the carbon in the coal and forming water gas, which process requires a considerably lower temperature.

According to Lewes, "Water gas depends for its formation upon the fact that at high temperatures carbon has a greater affinity for oxygen than hydrogen has, and that when steam and carbon (in any of its amorphous forms) are heated to such a temperature the steam is decomposed with liberation of hydrogen and either carbon monoxide or dioxide, the oxide formed being to a great extent dependent on temperature and the quantities of steam and carbon interacting. The action may be expressed as follows:



In the former case we have water gas, which has a lower ignition temperature than marsh gas, while in the latter case we have free hydrogen liberated in the combustion chamber.

These facts, which show the production of gases with lower ignition temperatures, have misled some into believing that it is desirable to wet the coal previously to firing, but an analysis of escaping flue gases will show the fallacy of such an assumption and make one realize that chemical combinations in a boiler furnace do not always result as they theoretically should, and that the lowering of furnace temperatures due to the cooling effect of water being present is bound to result in fuel waste.

It is announced that the Rising Fawn Furnace, Rising Fawn, Ga., which was last active in 1896, will soon be in blast again with a greatly increased capacity. The owners, the Georgia Iron & Coal Company of Atlanta, have increased their capital stock and are now making repairs, supplying new machinery and a 1500 horse-power battery of Cahall boilers, purchased from the Aultman & Taylor Machinery Company, Mansfield, Ohio. They hope to have the stack in blast by February 1, and expect at the start to produce 150 tons of pig iron per day, increasing the output to 200 tons as soon as all changes shall have been made. Rising Fawn Furnace is the only coke furnace in Georgia, is 75 x 17 feet, and is equipped with four Whitwell stoves. The present annual capacity is 36,000 tons. Joel Hurt is president.

* Deville in his experiments in the dissociation of water vapor found that with this vapor confined within a platinum tube a very limited dissociation occurred between 1760 and 1832 degrees F., and further heating to 2,192 degrees F. caused a further small decomposition to take place, but at these low dissociation temperatures the oxygen and hydrogen recombined almost immediately upon reduction of pressure and temperature.

The Improved Bath Water Grinder.

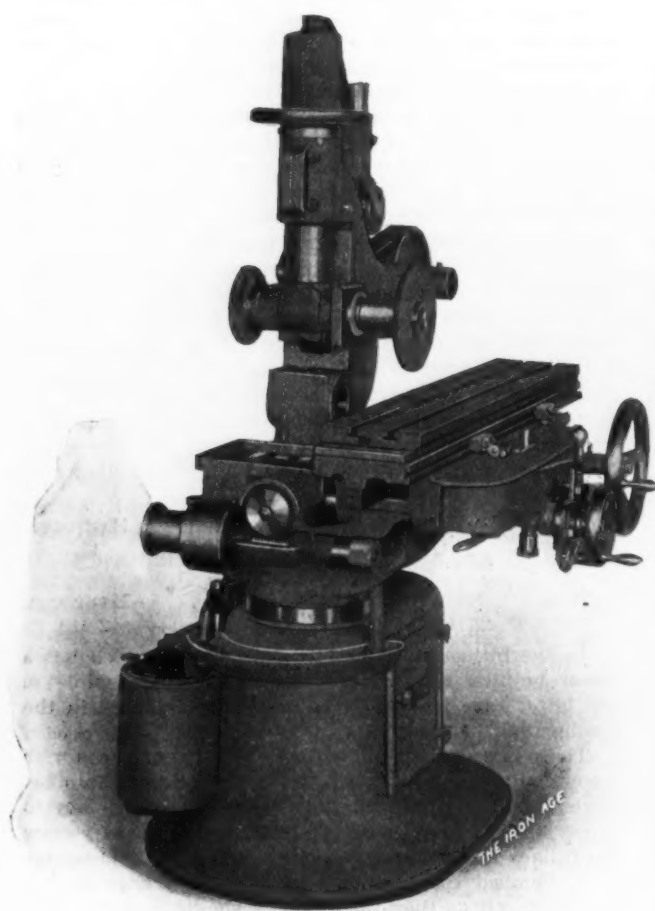
Several important changes have been made recently in the Bath water grinder. The wheel head is gibbed to the vertical slide, thereby insuring rigidity in any position. The vertical arm which carries the head can be clamped in its bearings if desired. The head may be adjusted above and below the center, and micrometer adjustment has been provided. The top portion of the vertical arm is threaded and is moved by a hand wheel and nut. The second engraving shows that a thrust arm has been furnished to prevent the axle movement of the dust cap nut. To this arm is also attached an idler pulley arm, which can be clamped rigidly or allowed to vibrate. The wheel head carries an adjustable hood which can be moved back or detached as the wheel becomes reduced in size. The knee and frame are so con-

The feed may be disengaged by a knurled knob placed back of the large hand wheel, Fig. 1. This machine is built by the Loop-Lock Machine Company of Waltham, Mass., the agents for whom are Hill, Clarke & Co. of Boston and Chas. G. Smith Company of Pittsburgh.

To Make the Gordon Drill Chuck.

Equipment for fitting out a machine shop is being purchased by the Milwaukee Modern Tool Company of 1487-1493 Third street, Milwaukee, Wis. The only orders placed thus far include a Kearney & Trecker universal milling machine and a 16 inch by 6 foot Prentice engine lathe.

The company will manufacture the Gordon drill chuck, leather cutting dies and special machines and tools. The Gordon drill chuck permits rapid changing



End View.



Rear View.

THE IMPROVED BATH WATER GRINDER.

structed that all water returns to the tank by the trough shown around the base of the machine. The swivel plate has two slots, which enable the head and foot stock and attachments to be used from the table without interfering with the head of the clamp screw, thus preserving the set alignment of the swivel plate.

The first view shows the knee swung around the column in position for surface work, also the new worm gear longitudinal automatic feed. The feed is driven from a drum in the overhead countershaft to a cone pulley at the side of the knee. When in use for cylindrical work the belt runs on the large step of the cone, and for surface work on the small step, which gives the higher speed required for the latter. At the front of the bottom slide is an inclosed box apron having a removable cover, so that all parts of the feed can be reached. The power cross feed attachment for surface work is so made that either one or two pawls can be engaged at the same time and adjusted to give a fine or coarse feed.

of drills and tools while the machine is in operation. It is designed to take straight shank drills and tools of any size within the capacity of the chuck. It is intended to manufacture four sizes, as follows: No. 1, to take from 1-16 inch to $\frac{3}{8}$ inch; No. 2, to take from $\frac{1}{8}$ inch to $\frac{1}{2}$ inch; No. 3, to take from 3-16 inch to $\frac{3}{4}$ inch, and No. 4, to take from $\frac{1}{4}$ inch to 1 inch shanks.

The officers of the company are as follows: F. H. Hagerman, president; Chas. Gordon, vice-president; H. Atherton, secretary and treasurer.

How much the depression abroad has affected the profits of European steel works is illustrated by the case of the Aciéries de Longwy, a French company. During the fiscal year ending April 30, 1902, the company made a profit of 1,959,852 francs, as compared with 6,372,598 francs in the preceding fiscal year, the production having been 169,670 tons of pig iron, 149,556 tons of steel and 145,310 metric tons of rolled products.

Drawback on Parts of Machinery.

WASHINGTON, D. C., September 30, 1902.—Recent correspondence between the Treasury Department and several manufacturers indicates that there is a widespread misapprehension with regard to the application of the drawback law to parts of machinery, motors, &c., imported into the United States in a practically complete condition and designed to be assembled or attached to other machinery of domestic production before being exported. The error appears to be based upon a confusion of the terms of section 30 of the tariff, relating to drawbacks, and paragraph 483 of the free list, covering articles the produce or growth of the United States exported and reimported into this country without having been advanced in value.

A case in point was recently presented to the Department in the application by the Providence Engineering Works of Providence, R. I., who desired to import from Canada an armature for a dynamo to be used in the construction of an electrical engine intended for use on a street railway in Canada. In urging a claim for drawback the applicants stated that they had "assumed, inasmuch as the piece was brought into this country merely for the purpose of assembling on an engine shaft and was returned without changing its value, that there would be no question concerning rebate." The Treasury Department, however, at first declined to consider the application and in rejecting it said:

"It appears from your letter that you 'do absolutely no work whatever on the generator spider furnished by the Canadian General Electric Company, merely forcing into it the shaft of the engine you are building, just as you would push a pencil into the hollow of a spool of thread.' In reply, I have to inform you that under the provisions of section 30 of the act of July 24, 1897, drawback is only allowed in cases where imported materials are used in the manufacture of articles manufactured or produced in the United States. Inasmuch as it very clearly appears from your letter that there is no manufacture whatsoever involved in the present case, the Department must decline to authorize the allowance of drawback."

The applicants protested against this decision and took an appeal to the Secretary of the Treasury, contending that the armature was not a completed machine, but was a permanent part of an engine and had been incorporated into it. It was further urged that the manufacturers might have sent the engine without the armature to Canada and have attached the armature there, but preferred to finish the engine at their works in Providence. This last consideration was given little weight by the Department, but the Secretary finally concluded that the permanent character of the attachment of the armature might be considered as controlling the case and he therefore made the following ruling addressed to the Collector of Customs at Providence:

"As it appears from the statements made by the applicants that the said armature has been incorporated into and has become a permanent part of the completed generator, you are hereby authorized, upon production of the usual proofs and compliance with the regulations of this Department as to the filing of drawback entry, &c., to allow the drawback as requested."

The importance of the drawback privilege in such cases may be gathered from the fact that the duty on this armature was between \$500 and \$600. In taking favorable action on this case the Department officials desire it understood that this ruling will not cover completed motors to be attached to engines, and that, generally speaking, the greater the amount of work required to be done upon imported parts of machinery, rather than the less, the closer will be the compliance with the terms of the drawback law.

The importance of liberalizing the drawback laws along the lines covered by the Lovering bill has been greatly emphasized during the Congressional recess. The attention which the discussion of the Lovering bill drew to the drawback question last spring has resulted in the receipt by the Treasury Department of scores of applications for the issuance of drawback regulations, and many manufacturers have learned for the first time the facts concerning the drawback privilege. Many of

these applications, however, have been denied on account of the inability of the manufacturers to meet the requirements considered necessary by the Department to protect the revenue. Some manufacturers, upon learning of the demands of the Department in the way of details concerning manufacturing processes, &c., have been disposed to withdraw their applications rather than communicate their "trade secrets" to Government officials. These instances have emphasized the fact that under the Lovering bill the Department would not feel called upon to insist that manufacturers supply such detailed data, and thus the application of the drawback principle could be more widely extended.

The prospect that the Lovering bill will be enacted into law at the coming session is greatly improved by the agitation of the tariff question now going on. The majority leaders in Congress having decided at a conference with the President that no tariff legislation should be attempted at the coming session, the importance of liberalizing the drawback laws is therefore emphasized. The late President McKinley frequently declared the drawback statutes to be the "safety valve of the protective tariff," and as only through the operation of more liberal drawback laws can manufacturers secure practically free raw materials for the export trade it is urged that no time should be lost in passing the Lovering bill.

W. L. C.

The Importations of Steel Beams and Structural Iron.

The Bureau of Statistics in Washington in the monthly reports of iron and steel importations does not give separately the figures relating to beams and structural material, apparently including them with all other manufactures of iron and steel. Yet in the finished iron trade there is no more important branch at the present juncture and widely varying estimates of the quantities imported are current in the trade. The New York Metal Exchange from week to week compiles the figures for the port of New York, but we are informed by C. Mayer, secretary, that the records for Philadelphia and other ports are not complete. According to Mr. Mayer's figures, there were imported the following quantities:

	Steel beams. Tons.	Structural Iron. Tons.
April .....	.....	64
May	970	65
June	1,814	21
July	2,013	..
August	2,767	30
To September 23.....	2,912	55

For a single port, even the most important, these figures show quite a movement. It is well-known in the trade that considerable quantities have gone via Philadelphia, and that, particularly lately, the Chicago district has purchased quite extensively, the material coming forward via New Orleans, owing to low ocean and land freights.

The records show that by far the greatest part of the imports into New York come from Antwerp and are therefore largely of German origin. Smaller quantities are shipped from Rotterdam, probably by Belgian mills, while small quantities come from Glasgow, from Sweden and from Hamburg.

The Jones & Laughlin Steel Company.—A meeting of the stockholders of the Jones & Laughlin Steel Company will be held in Pittsburgh on Wednesday, October 8, to vote on a proposition for issuing bonds to the amount of \$10,000,000. When the Jones & Laughlin Steel Company were organized an issue of \$10,000,000 in bonds was provided for and at the coming meeting these bonds will be issued, but none of them will be placed on the market. The proceeds of the bonds will be used to carry out large improvements and additions now being made to their works. These include the building of a large blooming mill, the addition of another converter in the Bessemer Works and other improvements. Within a year at the most the Jones & Laughlin Steel Company will have a capacity for turning out 1,200,000 tons of steel a year.

Notes from Mexico.

Opening of Congress.

DURANGO, September 24, 1902.—According to custom, the Congress of Mexico assembled upon the evening of the nation's anniversary of independence, September 16. The speech of President Diaz was comprehensive, covering the entire political, industrial and financial situation. The review of existing conditions in the Republic is for the most part a cheerful and reassuring one. The President comments with satisfaction upon the progress in mining, the activity in railway construction and the prosperous condition of the public revenues. While far too exhaustive to follow in detail, such topics as are of interest to the readers of *The Iron Age* which came within the scope of the President's address may be chiefly noted.

Delegates to Labor Congresses.

Evidence of the Government's sympathy with movements of the amelioration of the conditions affecting labor is given in the announcement "that the invitations to the nation to be represented at the international congress on labor accidents and social insurance at Düsseldorf, and the industrial and commercial congress of Ostende, and the mining congress at Butte, have been accepted," and that delegates have been appointed to these various gatherings.

Mining Progress.

The active condition of Mexican mining interests is reflected in the figures quoted by the President in relation to titles issued. In the last half year 1770 titles were issued covering mining claims aggregating 31,500 hectares in area. Of these titles 1583 relate to mining activities wherein the precious metals predominate.

Railway Construction.

The railway mileage of the country, the President notes, has been increased since his last review of the situation by 405 km., the total of the national railway lines and private branches being now 17,442 km. Of the new construction 143 km. are credited to the Vera Cruz & Pacific Railway, which is about completed, and which is the link between Vera Cruz and the National Tehuantepec Railway.

Railway Tariffs.

The progress made in the important matter of revising the tariffs of the different railways in relation to freight and classifications is a subject to which a paragraph is given in the message. "The commission," says the Executive, "for the revision of railway tariffs has reported on 154 special tariffs, many of them relating to articles of importation and exportation, care being always taken to protect the native merchandise, and in passing upon the classification adopted by the majority of the railways of the Republic the commission has condemned all such tariffs as conflicted with the principle of the most absolute equality."

The Government and Silver.

One of the most important utterances of President Diaz is that wherein he reviews the currency question and the depreciation of the peso. That the President and his advisers are keenly alive to the embarrassing conditions which the fluctuations in the value of the Mexican dollar bring about, and the country's somewhat anomalous position among the trading nations of the world, has long been evident. It appears from the remarks of President Diaz that the Government's attitude is still one of observation. He says:

"The Executive feels obliged to maintain a waiting attitude, and to continue its studies with a view to elucidating the various aspects of the question, such as the conditions surrounding the production, circulation and consumption of the metal in question, and as nearly as possible the advantages and disadvantages which its depreciation has occasioned, or may occasion, to Mexico. In any event, it is necessary to bear in mind that with silver we meet about one-half of what for various reasons the country is compelled to remit abroad, and that notwithstanding our substantial production of silver it would be rash for the Republic alone to attempt to regulate the world's output of the white metal and in that way to bring about stability in its price."

Industrial Notes.

An increase is noted in the imports of coal and coke by the railway companies, from the Pocahontas fields, by way of Mobile. Reports also show that of Mexican imports of iron ware from the United States, the greater quantity comes from Chicago, followed by Cleveland, Cincinnati and Philadelphia in regular order. J. J. D.

Canal Dover's Improved Condition.

About one year ago the mills of the American Sheet Steel Company were put into operation after a distressing and unnecessary strike. Some of the works resumed under rules and restrictions of the Amalgamated Association of Iron and Steel Workers and others as "open mills," in which union and independent men worked side by side, but the same scale of wages has been paid to all. Among the open mills those at Canal Dover, Ohio, present a notable instance of success. For many months the company patiently suffered the trials and tribulations incidental to mixing the two factions of men. Considerable loss was experienced on account of sheets spoiled in operations, also from spite work between men and from breakages that might have been avoided in a well organized plant. The management persisted in their efforts to secure peace and succeeded. Personal altercations between the workmen of different opinions have now ceased. They are as peaceful on the streets of the town as they are in the mill, and no longer does the Mayor collect a goodly sum of fines each Monday morning. Substantial repairs have been made, and now at the end of a year Canal Dover mills have reached a prominent position in the list of successful plants. Upward of 500 men are employed regularly, and the quality of their products is said to be of the finest. During last week the tonnage produced exceeded any previous record of the works. Many improvements are under way for the betterment of the plant and the comfort of the workmen, and we learn from local papers that the company, through their division superintendent, Ambrose Beard, arranged to equip reading and recreation rooms for their men in a building formerly occupied as a saloon and recognized as the vilest den of the locality.

Pig Iron in Canada.

The American Iron and Steel Association has received direct from the manufacturers the statistics of the production of pig iron in Canada in the first six months of 1902. The figures show a slight increase as compared with the last half of 1901, but a very great increase as compared with the first half of that year.

In the first six months of 1902 the production of all kinds of pig iron in the whole of the Dominion amounted to 157,804 gross tons, as compared with 149,952 tons in the last half of 1901 and 95,024 tons in the first half of the year. The increase in the first half of 1902 over the last half of 1901 was 7852 tons, or over 5 per cent., while the increase over the first half of 1901 was 62,780 tons, or over 66 per cent. Of the total production in the first half of 1902, 12,000 tons were Bessemer and low phosphorus and 57,209 tons were basic pig iron. The coke furnaces made 147,892 tons and the charcoal furnaces 9912 tons. Neither spiegeleisen nor ferromanganese has been made in Canada for several years.

The unsold iron held by Canadian pig iron manufacturers on June 30, 1902, none of which was intended for their own consumption, amounted to 37,721 gross tons, as compared with 59,472 tons on December 31, 1901, and 28,711 tons on June 30, 1901. Of the unsold iron on hand on June 30, 1902, less than 2000 tons were made with charcoal, the remainder being coke iron.

On June 30, 1902, Canada had 14 completed blast furnaces, of which 8 were in blast and 6 were idle. Of this total 9 were equipped to use coke for fuel, 4 to use charcoal, and 1 to use mixed charcoal and coke. In addition three coke and two charcoal furnaces were being built on June 30, 1902, but work upon two of the coke furnaces was temporarily suspended.

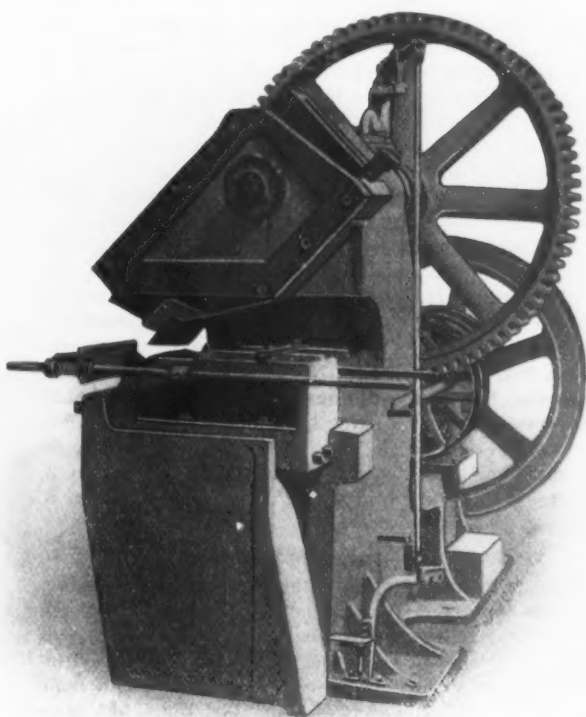
The New Cincinnati Beveling Shear.

The Cincinnati Punch & Shear Company recently built and shipped to a prominent pipe making concern the beveling shear here illustrated. From the front view it will be noted that the head is built at the proper angle to shear skelp for a weld. The stock is fed in horizontally from the side, and there is both an end and a side gauge, adjustable in each case for the different widths and thicknesses to be sheared. By an ingenious arrangement of the blocks and the blades the stock is cut without the ordinary flattening or notching of the material, which would leave a crease and perhaps a leak after being welded up. The machine is belt driven, but may be furnished with either motor or engine attached. The shaft is of hammered steel, the main bearing is bushed, the slide is hand fitted and with adjustable wedge for taking up the wear; the gears are machine molded, and

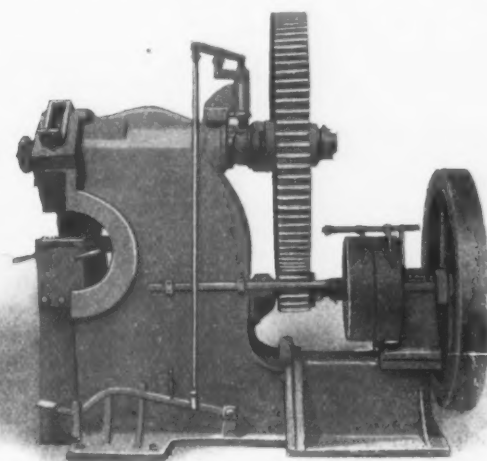
carbon of which it is composed to the volume of the electrode taken as a whole. As amorphous carbons and graphites retain the air, the determination of the real density is difficult.

Mr. Fitzgerald stated that one method is to boil the specimen, after reducing it to a fine powder. For example, in methylene iodide dilute till the carbon sinks and then determine the density of the liquid. This method is not suitable for manufacturing purposes. He described another method in which he uses a volumeter fitted with a rubber stopper through which a glass tube is passed, the end of the tube being bent back on itself. The volumeter is placed in a water bath, the other necessity of this test being kerosene oil. A specimen to be tested is weighed. The volumeter, partly filled with kerosene, is placed in the water bath; a reading is taken, the specimen introduced and the volumeter connected with the vacuum pump. When the maximum attainable vacuum is obtained through the vacuum gauge for a period of ten minutes the volumeter is disconnected and a reading taken, after which the operation is repeated and another reading taken. This is continued until two consecutive readings are the same. The difference between the last and the original reading is the real volume of the specimen, from which the real density is calculated.

In order to determine the apparent density the electrode is given a light coat of shellac and put in the volumeter, which now contains water, and the volume



Front.



Side.

THE NEW CINCINNATI BEVELING SHEAR.

the clutch is automatic. The machine weighs 14,000 pounds, and will shear plate $7 \times \frac{3}{4}$ inch at an angle of 45 degrees.

Testing Carbon Electrodes

A paper read before the American Electro-chemical Society at its recent Niagara Falls convention was entitled "Note on Testing Carbon Electrodes," and was prepared by Francis A. J. Fitzgerald, who is connected with the International Acheson Graphite Company of Niagara Falls. Mr. Fitzgerald pointed out that in both electro-chemical and electro-metallurgical processes, in which carbon electrodes are used, the determination of the density is important, as the general efficiency of the electrodes will depend upon the nature of the carbon and on the methods used in their manufacture. Both the real density and the apparent density should be found, for from these two quantities the porosity may be calculated. The real density was referred to as the density of the carbon of which the electrode is made, while the apparent density is the ratio of the weight of the electrode to its volume taken as a whole. The porosity is the ratio of the difference of the volume of the electrode taken as a whole and the volume of the

of water displaced is observed. To get at the porosity it is important that the real and apparent densities should be determined from the same specimen, since both these qualities vary in carbons. An average specimen should be obtained.

Mr. Fitzgerald further pointed out that "in certain electrolytic processes the use of amorphous carbon electrodes is unsatisfactory because of their rapid disintegration in the electrolyte. This may be overcome to a certain extent by special methods of manufacture or by using amorphous carbons, such as retort carbon, which show greater resistances to disintegration. Similar remarks apply to the use of carbon electrodes for the electric furnace in metallurgical work. Of all forms of carbon graphite shows the greatest resistance to oxidizing and disintegrating actions. When, therefore, it is possible to use carbon at all graphite gives the best result. It is obvious, however, that an electrode made like the ordinary graphite brush, such as is frequently used on dynamos and motors, would be of little use, since the graphite particles are held together by a binding material of amorphous carbon and consequently disintegration would be nearly if not quite as rapid as in the use of amorphous carbon electrodes. To obtain the best possible results the electrode should contain

no amorphous carbon and it is therefore important to have some method of testing electrodes to determine whether they are composed entirely of graphite."

Reference was made to M. Berthelot's method of separating the different forms of carbon by submitting them to the oxidizing action of a mixture of nitric acid and potassium chlorate, and Staudenmaier's method was favored when it is desired to test an electrode to determine whether it is composed wholly of amorphous carbon or whether it contains a certain amount of graphite.

The Pig Iron Position in Scotland.

The Heavy Demand from America.

GLASGOW, September 19, 1902.—The movements in pig iron continue to violate all precedent. Here in Scotland, with a 5 per cent. larger output than last year and considerably increased imports, we are quite bare of furnace stocks and the public stock in warrant yards is reduced to about 40,000 tons. That public stock is reputedly all G. M. B. (good mixed brands), but it is doubtful how much of it could be delivered as such. What iron we are sending from the Clyde to the United States and Canada by the regular liners is ordinary makers' iron and some special qualities. There is in consequence such a short supply for local foundries that we are importing more than ever from Cleveland. Up to the middle of September these imports have been over 350,000 tons, upward of 50,000 tons in excess of the quantity brought hither in the corresponding portion of last year. In addition to that we have imported some 20,000 tons from Nova Scotia and 10,000 tons from South Russia, the latter of but indifferent quality. And since the beginning of the year the stock in the warrant yards has been reduced by about 18,000 tons. Against all this the shipments of pig iron from Scotland from the first of January to the middle of September have aggregated 247,673 tons, as compared with 194,643 tons in the same period of last year. The increase has practically all gone to America (including Canada), even while we have drawn 20,000 tons from Nova Scotia.

In eight months ending August 31 the entire exports of pig iron from the United Kingdom to the United States were 211,317 tons. Compared with 27,957 tons last year, this means an increase of 183,360 tons. We should not have had this quantity to spare had Germany taken even as much as in 1901, which was a good deal less than she took in 1900. As compared with 1901, Germany has in the last eight months taken 133,000 tons less. America has made up for all that deficiency and has taken 50,000 tons in addition. Moreover, Canada has taken 17,000 to 18,000 tons more than in the corresponding portion of last year, so that the amount of the abnormal demand from your side of the Atlantic has been about 200,000 tons more than last year. This is so much in excess of the falling off in the European demand that our stocks have had to be drawn on, and would probably have been exhausted by this time but for the supplies we have, *per contra*, drawn in from abroad. But while the entire exports of pig iron from the United Kingdom in the eight months were 612,930 tons, as against 583,087 tons last year, an increase of 29,843 tons, the entire imports were 165,264 tons, as against 99,757 tons, an increase of 65,507 tons. It is evident that our home consumption must have been appreciably larger, although the home demand for finished iron and steel is less, not more, than in 1901. The excess of manufactured product, mostly in the form of steel material, has been exported to America and to markets which America has been unable to supply. The total exports of iron and steel of all sorts in the eight months were 2,239,300 tons, as compared with 1,941,739 tons last year, an increase of 297,561 tons. These figures are necessary to an understanding of the position of pig iron on this side. At the present moment the current demand for home and export is just about equal to the current make, and the balance in reserve is only about 190,000 tons, not much more than a week's home consumption.

Demand Turning to Steel Making Pig.

While this is so in general terms, there has been till now a fuller supply of steel making iron than of ordinary iron, because all the earlier demand from America was for the latter, while our own steel manufacturers were slack and consuming less hematite. But a change is now taking place. Several furnaces in Cleveland have been turned from hematite to ordinary iron, the steel makers are busier and are using more hematite, and America is now buying more hematite than ordinary iron. Within the last few days Glasgow firms have booked orders for 20,000 tons of Middlesbrough hematite, to be shipped from the Tees, and 10,000 tons of West Coast hematite, to be shipped by direct vessels from Cumberland to Philadelphia. This is Glasgow business, but of course American orders for English hematite may have gone direct to England as well. This week again Glasgow firms are booking further large orders from your side for Cleveland ordinary iron, and in the market here it is reported that a further large quantity of German iron has been sold for shipment to America at the equivalent, c.i.f., of about \$1 a ton under Cleveland No. 3. This German iron is of inferior quality. Makers' No. 3 has been and is scarce in Cleveland, owing to the large shipments to America, but the price has till now ruled a few pence under warrants. Makers are now asking 53 shillings 6 pence for No. 3 and 52 shillings for No. 4, the latter being the quality at present coming most freely to Scotland. Middlesbrough hematite is 57 shillings for mixed numbers, f.o.b., and Scotch hematite is 62 shillings, delivered to local steel works. At the time of writing warrants are: Scotch, 58 shillings 6 pence; Cleveland, 53 shillings 9 pence; Cumberland (hematite), 61 shillings 8 pence. Makers' prices in Scotland are: Coltness, No. 1, 70 shillings; No. 3, 60 shillings 6 pence; Gartsherrie, No. 1, 66 shillings 6 pence; No. 3, 59 shillings 6 pence; Langloan, No. 3, 60 shillings; Govan, No. 3, 59 shillings; Eglinton, No. 1, 60 shillings; No. 3, 56 shillings; Glengarnock, No. 1, 69 shillings 6 pence; No. 3, 59 shillings 6 pence; Shotts, No. 1, 69 shillings; No. 3, 59 shillings 6 pence.

Manufactured Iron and Steel.

It cannot be said that the home trade in manufactured iron and steel is very active, although the consumption of crude material is large. For ship plates there is a decreasing demand as activity in the shipbuilding industry declines, nor is there now much hope of revival in this branch this year. But there has been an increased demand lately for steel rails for export and heavy sections have been bringing £5 to £5 5s. per ton, f.o.b. Last week there was rather a decrease in the shipments of iron and steel from the Cumberland ports, but the total for the year so far is 131,000 tons ahead of last year from that district alone. It is significant that the books of the Society of Boiler Makers and Iron and Steel Shipbuilders show a monthly increase in the number of unemployed members and that the Federated Shipbuilders on the Tyne and Wear have given notice that the time has arrived when wages should be reduced. And in this connection it may be noted that the Executive Council of the Amalgamated Society of Engineers (commonly known as the A. S. E.) have come to an agreement with the Federation of Engineering Employers for the fair and honest trial of the bonus system (which the trade union has hitherto opposed) in the federated workshops.

For some time the rolling of heavy armor plates has been carried on at Glasgow on a large scale by William Beardmore & Co., Limited. The company are now about to adopt a new system of casting steel ingots recently introduced into Germany. Under this system pressure is applied in the process of cooling the molten metal as it runs into the mold, so as to obviate the present tendency to crack through lateral contraction. A hydraulic ram working from the bottom of a conical mold raises the "shell" so as to force it against the cool sides of the mold. Being thus forced upward, the "shell" closes in upon the central mass in proportion as hollows are formed by shrinkage. Solidification being hastened, coarse crystallization with cleavages is prevented, and also a tendency of the carbon to accumulate in the upper part of the ingot is lessened. This

new system of casting is said to produce better steel and to increase the productive capacity of the plant by 25 per cent.

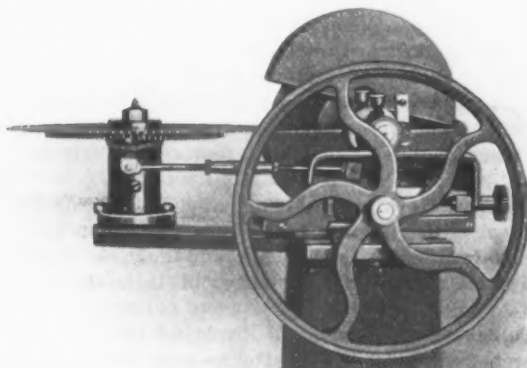
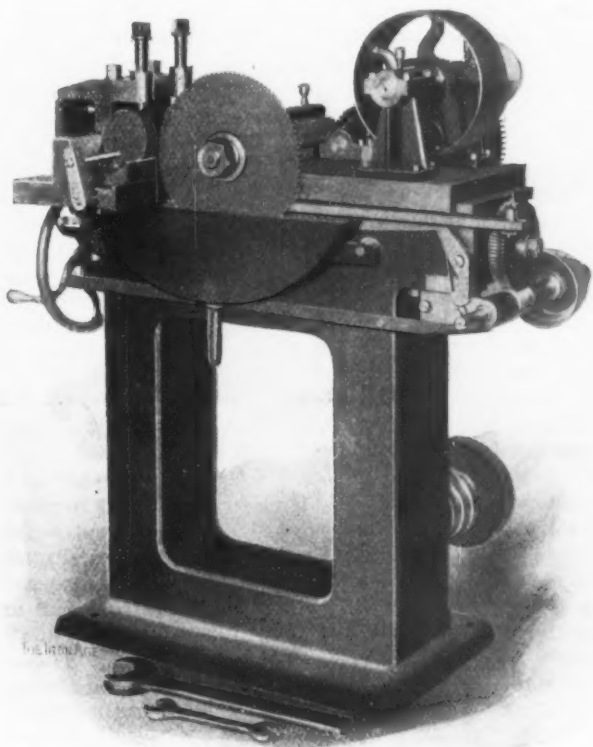
A new type of locomotive is being put on the passenger express service from Glasgow to London by the Glasgow & South Western and Midland railways. The new engines are of compound construction and have three cylinders working simultaneously at high pressure. Each engine weighs 150 tons and can haul a 250-ton load from London to Carlisle at an average speed of 60 miles an hour, although the line covers a range of hills and at one part of the route the gradient is 1 in 100 for 15 miles. On the down grade a speed of about 77 miles an hour is made. These engines are made at the locomotive works of the Midland Railway Company.

The coal arbitration has ended in favor of the coal masters—that is to say, that there shall be an immediate reduction on the percentage basis, which is equal to 3 pence per day. This reduction brings the rate down

It will cost \$750,000 to construct and equip the rapid transit system upon the World's Fair grounds. The length of the road and its branches will be 8 miles and it will enable the visitors to see the exposition with as little fatigue as possible. The problem in planning the intramural road has been to place it where it would not mar the beauty of the exposition. Eminent engineers have been called into consultation and all phases of the project thoroughly studied. It is believed that the plan presented by Charles V. Weston of Chicago comes nearest to a perfect solution of the difficulty. Owing to the varying altitudes of the exposition grounds the road will be at times an elevated line and in other parts built at grade or below the surface.

The New Boston Metal Cutting Off Machine and Automatic Saw Grinder.

We here illustrate two new machines built by Nutter, Barnes & Co., 366 Atlantic avenue, Boston. The first is designed for cutting iron or steel of any shape and up to 4 inches in diameter. The saw, which is driven by gearing from the belt shaft, is 13 inches in diameter and only $\frac{1}{8}$ inch thick. The saw and its driving mechanism are placed on a slide 15 inches wide by 20 inches long, which moves forward automatically and has a quick return. The saw arbor is $2\frac{1}{4}$ inches in diameter and



THE NEW BOSTON METAL CUTTING OFF MACHINE AND AUTOMATIC SAW GRINDER.

to 5 shillings 6 pence per day, which is the minimum wage within the jurisdiction of the Conciliation Board.

B. T.

St. Louis World's Fair Notes.

The plans and specifications for the structural steel work on the Government Building are ready for bidders in the office of the Director of Works at St. Louis and of the Supervising Architect at Washington, D. C. Bids will be received by the Supervising Architect's office until 2 p.m., October 15, 1902. The plans of the steel work show that the great building is to be spanned at a single leap by the big steel trusses. The trusses will spring from the floor line and in a continuous elliptical curve will form walls and roof. The radius of the ellipse will be 162 feet. The Supervising Architect, James Knox Taylor, will let each contract separately, the contract for the foundations to one man, structural steel work to another, staff to another, carpentering to another, &c. The foundations of the Government Building shown are of concrete and of piling. One end of the gigantic trusses will be fixed. The other end will rest upon rollers and be movable to provide for temperature strains. There are to be 22 big trusses, besides purlin trusses, sway trusses and lattice struts.

$14\frac{1}{4}$ inches long. The range of feed is from 1 inch per minute to 1 inch in four minutes. The work shoe is surrounded by a channel to catch the dripping and return it to the trough, which is under the saw.

The second illustration is of an automatic saw grinder. After the saw has been indexed around and a light cut taken, another and deeper cut is made by a slight movement of the adjusting screw, three minutes being required to go once around a 13-inch saw. The saw is indexed, not from the teeth, but from an index cut accurately with the same number of teeth as the saw.

In the United States Circuit Court, at Pittsburgh, last week, some interesting decisions were handed down. In the case of H. & T. Fairbanks Company, who charge the Standard Scale & Supply Company with infringement, the court held that the infringement device was a duplicate of the first claim of the patent. The patent is on a scale lever. In an opinion in the case of the Best Mfg. Company against the Lawrenceville Bronze Company and the Republic Iron & Steel Company for infringement on a patent plate for cooling furnace bosh the court found for the plaintiff. A similar opinion was filed in the case of the Best Mfg. Company against the Fox Copper & Bronze Company *et al.*, an infringement of patent on a furnace plate.

Cincinnati Fall Festival Exhibits.

At the Fall Festival held at Cincinnati, Ohio, September 15 to 27, the machinery and allied trades were well represented by interesting exhibits of the manufactures of the various concerns in that city.

The Lodge & Shipley Machine Tool Company displayed an exceedingly well finished engine lathe operated by electric motor.

The Cincinnati Planer Company had on exhibition one of their medium sized planers.

The Cincinnati Shaper Company had on view two of their well-known productions and a series of large photos illustrating their full line.

The Bickford Drill & Tool Company exhibited one of their No. 1 radial drills, also a large size plain upright drill operated by electric motor.

The Cincinnati Milling Machine Company's exhibit consisted of one of their No. 3 milling machines, also a smaller size of their plain miller.

The Oesterlein Machine Company displayed two sizes of the Oesterlein milling machines, also the Oesterlein friction clutch.

The Cincinnati Punch & Shear Company's exhibit consisted of one of the largest sized gang or multiple power punches.

The Cincinnati Electrical Company exhibited a number of dynamos of various sizes.

The Jantz & Leist Company also exhibited a number of dynamos and electrical novelties.

The Frank M. Watkins Mfg. Company exhibited a new marine vapor engine, which for compactness and excellence of design created much favorable comment, a 60-light gas engine being also a feature of their exhibit.

The Warner Elevator Mfg. Company, in addition to the practical demonstration of the use of a 4-ton passenger elevator used to convey visitors to the upper floors of the Music Hall, showed a number of their elevator devices.

The Salzman Mfg. Company displayed their Rock-away porch and lawn swing, also feeders, sifters and mixing machinery.

The Peters Cartridge Company's exhibit consisted of a large log cabin, 20 x 30 feet, the decoration of which was mainly composed of the company's products and an assortment of sporting goods.

The James Heekin Company showed their patent Kin-Hee coffee pot by practical demonstration, using but half the usual quantity of coffee and preparing it ready for serving in one-half a minute.

The Wm. Miller Range & Furnace Company had on exhibition a large variety of wrought steel ranges for hard or soft coal, also gas stoves, laundry stoves, dryers, &c., all of their own production.

The New Era Heating & Ventilating Company exhibited their new warm air furnace and heating apparatus, the principal feature of which is the great amount of heating surface secured by their especial construction and the consequent economy of fuel.

The Efficiency of the Electric Furnace

Prof. J. W. Richards of Lehigh University, Bethlehem, Pa., before the American Electro-Chemical Society discussed the efficiency of electric furnace operations, citing the following calculations:

In the electrolysis of salt for the production of metallic sodium (Acker process), 7 per cent. of the total energy was required to bring the materials to fusion and the working temperature, 54 per cent. was required for the electrolytic separation, and 39 per cent. was radiated; the efficiency was, therefore, 61 per cent.

For producing barium oxide and sulphide from the sulphate an efficiency of 60 per cent. was calculated.

In the manufacture of artificial corundum (Norton Emery Wheel Company) by heating alumina (without any chemical reaction), the efficiency was 74 per cent.

In making calcium carbide the heating consumed 15 per cent., the chemical reaction 47 per cent.; efficiency therefore 62 per cent.

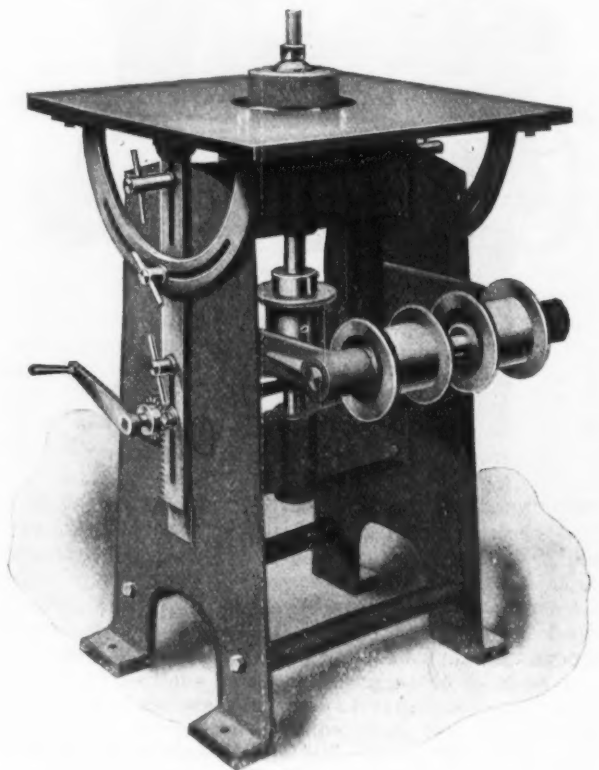
In graphitizing anthracite coal (Acheson process) there is probably a gain of heat by chemical reaction, estimated at 10 per cent. of the energy input. Out of the 110 per cent. of the electrical energy thus available 75 per cent. is utilized. In graphitizing miscellaneous articles of amorphous carbon the heating of the articles consumed 40 per cent., heating the packing material 30 per cent. Since this latter is necessary to the operation the efficiency may be considered to be 70 per cent.

In refining alumina the efficiency is nearly 60 per cent.

In making carborundum the efficiency is 57 to 62 per cent., with about 53 per cent. absorbed in the chemical reaction.

The Tucker Vertical Grinder.

The need has long been felt among stove manufacturers and others for a machine that will grind castings vertically. To meet the demand for such a tool the Tucker Machine Company, 224 East Ninth street, Cin-



THE TUCKER VERTICAL GRINDER.

cincinnati, Ohio, have brought out the vertical edging and inside grinding machine illustrated herewith, the construction and operation of which are clearly indicated in the cut. The machine is provided with a tilting table 2 feet square, which can be set by the operator at any desired angle. The table has also a raising and lowering device which gives a range of 4 inches in either direction. The machine is also adapted for grinding the inside of circles, scrolls, &c., as it carries a wheel as small as 2 inches, and from 2 to 8 inches in diameter by 4 inches face. The countershaft has 14 x 3 and 8 x 3 tight and loose pulleys and is calculated to make 750 revolutions a minute. The height of the machine is 36 inches.

The Safety Angle Bar & Railway Supply Company of Kansas City contemplate the construction of a rolling mill within the next 90 days. The cost of the buildings is estimated at from \$50,000 to \$65,000. The company have been tendered 10 acres of ground in the vicinity of Leeds, Kan., and have the proposition under advisement. The product of the mill will be safety angle bars and other track supplies. The officers of the company are: E. H. Phelps, president; M. B. Lease, vice-president; W. H. Winants, treasurer, and J. H. Goodwin, secretary.

The Prospects in China.

As the British and Chinese Governments have now acquiesced in the Chinese Treaty, and as a serious attempt is being made to meet the requirements of the provincial Governments, all information bearing upon commercial prospects there should prove valuable. The official journal of the Russian Ministry of Finance gives some valuable information, from which the following is taken:

At the end of 1900 there was a general conviction that with the cessation of the troubles in the northern provinces there would be renewed activity in the trade of the Celestial Empire. Facts have certainly justified this supposition, for, in spite of the great outlay which China has had to bear, its foreign trade in 1901 was much greater than that of former years, with the exception of 1899. Although there has been a fall in the price of silver the rate of exchange between China and foreign countries has become satisfactory; thus at the beginning of the year the rate of exchange at Shanghai upon London at four months' date was 2 shillings 11½ pence; at the end of 1901 the rate was 2 shillings 6¾ pence.

According to the returns made by the Chinese authorities for 1901 commercial activity has been developed most notably in the ports of Northern China, which suffered the most from the disorders of 1900, although Tientsin has not yet recovered its former place as a trading center. Of 24 principal ports mentioned Shanghai easily heads the list both in imports and exports during 1901. China's imports in 1901 exceeded its exports by 98,646,161 taels. Among the imports cotton becomes more and more an important item. In 1901 China imported cotton goods to the value of 24,000,000 taels more than was the case in 1900; this increase has been mainly in favor of the United States and to the detriment of English exporters. As a general rule the Chinese customs returns show that there is a steady increase of American trade with China. Moreover, Great Britain begins to find Japan a serious competitor in exporting coal to China. The trade in petroleum is monopolized almost entirely by the United States. In 1901 the United States exported to China 56,760,000 gallons of petroleum; Sumatra sent to China 40,640,000 gallons, and Russia 32,486,000 gallons. Compared with 1900 the United States oil trade with China showed an increase of more than 23,000,000 gallons, while Russia's oil trade with China fell off 200,000 gallons.

Chinese industry has taken a fresh start. Shipbuilding has been pushed forward especially, owing to the formation of a syndicate by the various shipbuilding yards. The presence of the foreign troops contributed indirectly to further the development of breweries and distilleries. On the other hand, the textile industries, especially cotton spinning, have been slack, owing to the increased cost of the raw material, which has to pay an ad valorem duty of 5 per cent. The year 1901 was not entirely favorable to the mining and metallurgical industries of China, but they are bound to play a leading part in the economic future of the country as soon as the normal state of public life is fully restored. The only mining concession granted by the Chinese Government in 1901 was obtained by a Japanese company for the purpose of working the coal fields in the province of An-hui, of which the most important are situated near to the town of Vow-How. In addition, a Chinese mining company, founded about 15 years ago, have been turned into an international company with a capital of £1,000,000 sterling and with their head office in London. This company employ 80 European officials. Also in 1901 a new extension was given to the exploitation of the coal fields in the province of Shantung. The journal draws attention to the facts that the mining industry is most developed in the province of Szechuan and that the most important concessions are in the hands of British and French exploiters.

With regard to railways the work commenced previously was continued in 1901, but no new concession was granted. In Northern China the Manchurian Rail-

way was brought into connection with Newchwang and with Port Arthur. The Chinese Imperial Railways, of which the greater part are in the hands of the British, had a total length of 901 km. on January 1, 1902. The main line of the system is that which runs from Peking to Tientsin, Tonkow and Newchwang, with a branch line to Ching-va-tow, Feng-tai, Lu-han, Tung-chow and Hein-Min-Tung. It will be observed that the Russian official organ is discreetly silent with regard to Russia's recent railway activity in connection with the Eastern Railway of China.

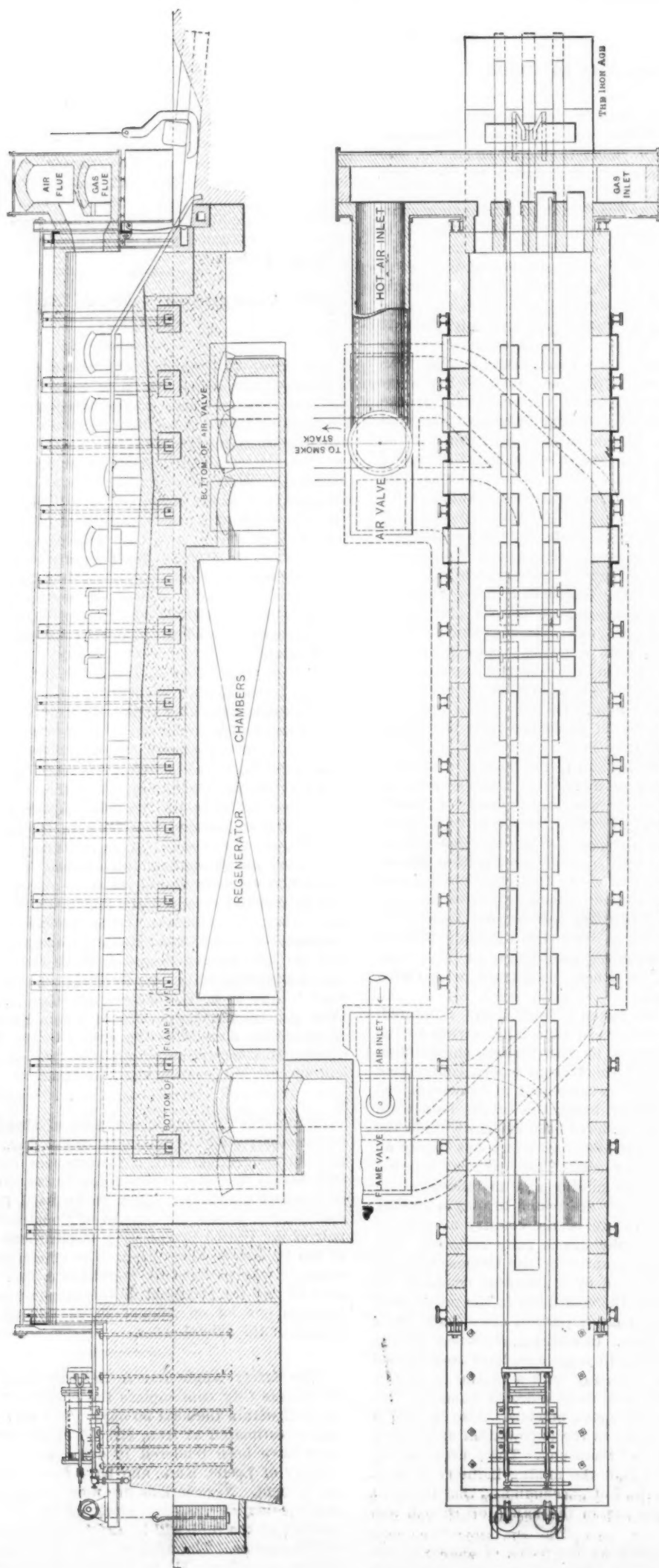
The Youngstown Iron & Steel Roofing Company.

The sheet mill plant of the above named company at Youngstown, Ohio, has now been in operation for one year and has made a very successful record. The Youngstown Iron & Steel Roofing Company were organized in 1894 to manufacture iron and steel roofing, and two years later added a department for making metal lathing and bridge flooring, which was later materially enlarged. After the consolidation of the sheet mills in 1898 some difficulty was experienced in getting prompt deliveries of sheets and the company increased their capital stock to \$300,000 for the purpose of erecting a plant to make their own sheets. Having proved to their satisfaction that iron sheets for roofing purposes possessed certain qualities superior to steel sheets, the management decided to engage in the manufacture of the former.

A large tract of ground was bought in the eastern part of Youngstown and they built four hot mills, with accompanying roughing mills, two cold mills, sheet bar mill, four double puddling furnaces and other departments. A 60-ton electric traveling crane covers the main building, which is 130 x 300 feet. A 250-kw. generator drives the machinery, while the boiler plant contains two batteries of 700 horse-power each Stirling water tube boilers and four Meehan waste heat boilers of 300 horse-power each. A galvanizing plant, 60 x 150 feet, with every modern convenience, was also built. The office force is housed in a commodious building, well lighted and arranged and supplied with dining room and other conveniences. The stockholders of the Youngstown Iron & Steel Roofing Company also constitute the Youngstown Range & Stove Company, operating an adjoining plant. Much of the success of the company is due to L. E. Cochran, president, and John O. Pew, general manager, both of whom have long been prominent in manufacturing circles in the Valleys, and Charles B. Cushwa, superintendent, who has had excellent success in operating the new plant.

A remarkably prompt shipment of sheathing copper was recently made by Merchant & Co., Inc., of Philadelphia in connection with a Government contract. The transaction included approximately 48,000 pounds of cold rolled sheathing copper to be used for sheathing coal barges, which the Bureau of Construction and Repair of the United States Navy Department are building at the Pensacola Navy Yard. The official award of this contract was received by Merchant & Co., Inc., on August 25 and the shipment of the copper was made complete in one lot on August 30, or five days after the receipt of the official order.

The Safety Angle Bar & Railway Supply Company of Kansas City contemplate the construction of a rolling mill within the next 90 days. The cost of the buildings is estimated at from \$50,000 to \$65,000. The company have been tendered 10 acres of ground in the vicinity of Leeds, Kan., and have the proposition under advisement. Negotiations are now pending for the sale and placing of treasury stock of the company. The product of the mill will be safety angle bars and other track supplies. The officers of the company are: E. H. Phelps, president; M. B. Lease, vice-president; W. H. Winants, treasurer, and J. H. Goodwin, secretary.

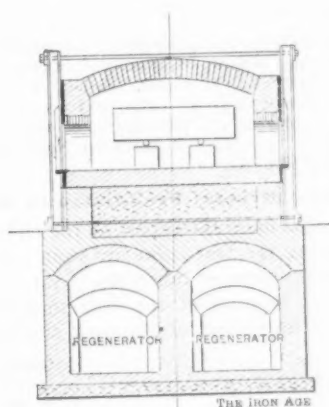


Vertical and Horizontal Sections.

THE NAU CONTINUOUS INGOT HEATING FURNACE.

Results in a Continuous Ingot Heating Furnace.

At the plant of the New York Steel & Wire Company, at Astoria, L. I., a horizontal continuous ingot heating furnace has been working for over a year with the very best results. The blooming mill in the works is a 30-inch reversing mill, large enough to roll in 12 hours' time the whole product made in 24 hours in two 30-ton basic open hearth furnaces. One single heating furnace of the continuous type, of a total length of 60 feet, capable of holding 44 14-inch ingots, had been provided to heat the steel. As in the ordinary billet heating furnace, the ingots were pushed in at one end by means of a hydraulic pusher over two parallel water cooled pipes running to within about 6 feet of the discharge door at the other end, and before the ingots left the furnace at the discharge end they had to be pushed on the remaining 6 feet of crushed magnesite bottom in order to remove from the ingots the two dark spots left on them at the point of contact with the water cooled pipes. The gas and air ports were located near the discharge door in the two side walls on either side of the door, which, of course, made the flame come in from the two sides. Thence it traveled through the whole length of the furnace toward the charging end, where the products of combustion left the furnace



Cross Section.

THE NAU CONTINUOUS INGOT HEATING FURNACE.

through the smoke ports, located at a certain distance from the charging door.

This furnace was a failure. The flame issuing from the side ports struck both ends of the ingots, usually burning off the ends, while the middle of the ingot was left too cold to be rolled well. Another trouble of no less importance was due to the slag penetrating the walls of the gas and air ports, and not only filling up the latter, but also filling partly the gas and air flues located under the furnace. Of course, this occasioned many costly stops, heavy repairs and dissatisfaction everywhere. The company, being disinclined to shut down completely, disliked the idea suggested by the superintendent, J. B. Nau, to tear the furnace out and to replace it by suitable pit furnaces.

After much worry and trouble and many changes and gradual improvements that he made at each stop, the superintendent was finally allowed to tear out entirely the ports in the side walls and to rebuild this end of the furnace according to his own ideas. After this change was made a great improvement was noticed at once. The ingots heated evenly all over, yet in the way the ports were rebuilt the heating was still found to be too slow. But as this offered a good opportunity to study the working of the furnace and thereby to find out in what manner the final improvement of the ports should be made to obtain a complete success, it was decided to run the furnace for about two weeks and meanwhile to rearrange the plans of the ports and to lay out all the alterations required. After all this was done and every piece made ready for the alterations work was stopped on Friday night, the ports were torn out,

the air flue remodeled and the furnace was made ready to start rolling again on the following Tuesday. This was done with complete success. With the exception of some minor improvements and changes, that were undertaken and carried out every time on Sunday without in any way interfering with the work during the week, the furnace has been running in its present shape for over a year, and has not only given very good satisfaction in heating, but is also very economical in coal consumption.

The accompanying drawing shows the general outline of the furnace and does not require much explanation to be understood. Gas and air ports are located over the discharge door and are arranged so that the gases are completely ignited when they leave the ports. The flame encircles the ingots over their whole length and passes underneath as well as over them. When in the very hottest part of the furnace the ingots are pushed a little more, slide down over the inclined pipes and leave the furnace by gravity. The impetus is enough to push them over several feet of an inclined table built outside the furnace, where they come to a standstill by butting against two stoppers, so located that when the ingots are stopped they lie across a pair of heavy hooks hanging from an overhead crane. On these hooks they are raised at once and put on the blooming mill table.

In some particulars, however, the working of the furnace could be materially improved. In the present instance these improvements could not be undertaken for the reason that many parts of the original furnace had to be left unaltered on account of local existing arrangements that it would have taken too much time and money to tear out and replace by more suitable parts.

In some new furnaces of the same type, now building in other steel works, all these objectionable features are avoided, while some further improvements in the piers supporting the water cooled pipes as well as improvements for the easy access of the ingots in the furnace have been introduced.

In the Astoria furnace the length of the gas flue to the furnace is nearly 500 feet, the gas flue being so deep in the ground that at times some parts of its bottom are covered with water. The gas is nearly cold when it reaches the furnace. The air is heated, but the original regenerators, which it was impossible to change, are so built that considerable radiation is unavoidable, while some further heat is lost by the great length over which the hot air has to travel before reaching the combustion chamber. In spite of all these deficiencies the furnace heats easily in 12 hours 100 and more cold charged 14-inch ingots weighing about 3000 pounds each when 5 feet 6 inches long.

The heat is uniform. The dark spots, where the ingots come in contact with pipes, show only a little and give no trouble. As already stated, rolling is only done during the 12 hours' day shift. No rolling is done at night, but the furnace has to be kept hot. Yet in spite of these 12 hours of idle heating at night the whole coal consumption per gross ton of cold charged ingots, from as close an estimate as could be made during practically a year, is in the neighborhood of 200 pounds.

If rolling were done during the night shift as well, to make use of the heat thus practically wasted, a little more than one-half of that amount, or say 125 pounds, of coal per gross ton of cold charged ingots, would be required, and in a furnace with hotter air and hotter gas a larger tonnage of steel could be heated with the same quantity of coal.

In some large rolling mills, for which ingots and slabs are bought in the open market and therefore all the ingots are cold charged, the average monthly coal consumption amounts to over 260 pounds per gross ton, or more than twice as much as in the case of the continuous furnace. The pipes on which the ingots slide wear out in the cold end of the furnace where they come in contact with the cold steel and after about 7000 to 8000 tons are pushed over them they must be taken out and replaced by a spare set. The pipes so removed are not lost, but can be turned over about 90

degrees and used again in the furnace; so that one set of pipes can be used four to five times or for about 30,000 to 35,000 tons before they are discarded. Another advantage of the continuous furnace results from the fact that the steel is heated up gradually and not suddenly, which is very desirable, especially in the case of hard steel.

Canadian Notes.

Londonderry Furnace to Be Operated Again.

TORONTO, September 27, 1902.—The blast furnaces, ore and coal deposits, woods, lands, water powers, &c., of the Londonderry Iron Company have been purchased by a syndicate, made up chiefly of Montreal men. These properties are at Acadia Mines, N. S., where for years the Londonderry Iron Company carried on operations. That company never realized the success that their advantages seemed to promise, their operations being more or less intermittent until finally they ceased altogether a few years ago, when the company went into liquidation. There are 30,000 acres of land, and when the works were most actively engaged they employed from 400 to 500 hands. During the last three years the foundry plant has been leased by Drummond, McCall & Co. and they have used it for manufacturing water pipe and other castings. In the syndicate which has now acquired the whole property the members of that firm are included. It consists of the following persons: George E. Drummond, Thomas J. Drummond, James T. McCall, Lieut.-Col. Fred. Henshaw, Edgar McDougall and Chas. W. Brega, the last named being a Chicago man, the others Montreal men. The Drummonds and Mr. McCall, besides being connected with Drummond, McCall & Co., are leading members of the Canada Iron Furnace Company, who have one furnace at Midland, Ont., and another at Radnor Forges, Quebec.

The Londonderry plant is to be at once placed in first-class condition for the manufacture of foundry pig iron and castings. The capacity of the plant is about 35,000 tons of pig iron and upward of 6000 tons of castings per year.

It appears that the purchase was brought about as a result of the recent annual meeting of the Canadian Manufacturers' Association at Halifax. The Drummonds were looking about for a desirable foundry site in Nova Scotia to take the place of that held under lease at Acadia Mines, which had lately been destroyed by fire. When at the Halifax meeting they concluded to look over the old Liverpool Company's whole plant, and were thus led to purchase it. The starting up of the works once more will tend to bring back to Acadia Mines the industrial population that was dispersed thence in consequence of the closing down of the Liverpool Iron Company. Many of the people emigrated to the United States.

A Protectionist Minister.

Hon. J. Israel Tarte, Minister of Public Works in the Dominion Government, has made several speeches lately avowing himself a protectionist. This course is somewhat singular, though it may be significant, for the Laurier Government took office very positively pledged against protection. Since the elections which returned Sir Wilfrid to power in 1896 he and his colleagues, with the recent exception of Mr. Tarte, have not ceased to represent their trade policy as anti-protectionist. It is true they did not sweep away protection when they revised the tariff, but their first reason for leaving any of it was stated to be not to make changes suddenly or violently lest the effect might be disastrous to existing industries. Further installments of free trade were again and again promised, and are still being promised by Mr. Sifton, Minister of the Interior, and Mr. Fisher, Minister of Agriculture.

Mr. Tarte apparently believes, however, that protection is the popular policy, and, being a very valuable man, he does not hesitate to say so, though such declarations in the absence of the Premier in Europe appear very irregular, especially when the latter is known to be strongly committed to the principle of free trade.

But Mr. Tarte is powerful in Quebec, and it is the Quebec vote that turns the party scale, whether toward the Tory or the Government side. If he insists it is difficult to see how the Government can reject his policy. In pursuance of his intention to press in the Council Chamber for higher duties, the Minister of Public Works is informing himself these days as to the state of some of the industries under the present tariff. He has visited the leading cotton mills and investigated the conditions affecting cost of production, profit, &c., and declares that the cotton industry is not sufficiently protected. He has also made a study of the working of the tariff in respect to the iron plants of Montreal. On the 15th inst. he visited the works of the Montreal Rolling Mills Company, of the Caledonia Iron Company and of the Pillow Hersey Company. He made what he considered to be a thorough inspection, inquiring as to the companies' experience of the tariff. He expressed some surprise to learn that a great deal of the raw material has to be brought from Germany and other countries, and thought there was no reason it should not all be produced in Canada if the duties were properly adjusted. The manufacturers were of the opinion that excellent results would follow if all the raw material could be got at home.

Speaking on the 24th inst. at Gananoque, one of the manufacturing towns of Ontario, his remarks are in part thus reported:

What he wanted was that the great manufacturing centers—Toronto, London, Guelph, Gananoque, Collingwood, Owen Sound, Berlin, Brantford, Montreal, Quebec, Three Rivers, St. Hyacinthe, Sherbrooke, Magog, Valleyfield—in a word, all the manufacturing centers of the Dominion—be able to sell to our Northwest friends. He wanted them to have the preference over the American centers.

Six Months' Mineral Production in Ontario.

Following close upon the report of the Ontario Bureau of Mines covering the last calendar year comes another showing the production of minerals in the province during the past six months of the current calendar year, compared with the output of the first half of 1901:

	1902.	1901.
Gold product, ounces.....	7,162	6,646
Value of gold.....	\$128,866	\$116,898
Silver product, ounces.....	63,000	68,200
Value.....	\$32,760	\$40,776
Nickel-Copper:		
Ore raised, tons.....	180,062	132,370
Ore smelted, tons.....	105,712	95,573
Nickel in matte product, tons.....	3,193	1,982
Copper in matte product, tons.....	2,130	1,819
Value of nickel in matte.....	\$1,307,544	\$416,288
Value of copper.....	\$332,877	\$178,476
Copper:		
Ore raised, tons.....	8,830	.....
Concentrates produced, tons.....	290	.....
Value of ore.....	\$49,630	.....
Value of concentrates.....	\$10,370	.....
Iron:		
Ore raised, tons.....	202,776	68,564
Value of ore.....	\$294,252	\$70,572
Ontario ore smelted, tons.....	45,538	41,172
Foreign ore smelted, tons.....	43,718	28,591
Mill clinder, &c., tons.....	8,544	3,832
Pig iron product, tons.....	55,596	41,294
Value of pig iron.....	\$775,053	\$594,617

Toward the close of the six months the smelting works at the Gertrude nickel mine, owned by the Lake Superior Power Company, went into operation. There has been a slackening of the rate of production at the Copper Cliff works of the Canadian Copper Company since the International Nickel Company took possession. Of iron ore Ontario mines—mainly the Helen—supplied 51 per cent. of the ore smelted, the remainder being imported from the United States.

Steel Rail Making.

In Canada the making of steel rails has been an industry of slow growth. Until the opening of the mills of Mr. Clergue's Algoma Iron & Steel Company none were made on this side of the border. Works for the manufacture of rails and ship plates are being built and equipped at Sydney, N. S., as part of the establishment of the Dominion Iron & Steel Company, but it will be some time before these are ready to turn out product. The manufacture of rails was begun at Sault Ste. Marie on May 5. That the industry had not been started some-

where in the country before that time is due no doubt to the fact that steel rails are on the free list. It cannot be owing to any lack of a market, for Canadian railway mileage has gone on steadily increasing, and at a more rapid rate relaying of tracks has been carried on. There is scarcely another product into which Canadian steel can be turned that the tariff does not more encourage the manufacture of than it does of steel rails. Consequently it seems more profitable to make the billets into machinery, bridge shapes or other structural material, &c., than to make them into rails. Rails not less in weight than 45 pounds per yard are free when they are to be used for steam lines.

Since the 11th inst. the steel plant at Sault Ste. Marie has been turning out fish plates in addition to its other finished products. The fish plate mill has but recently been completed.

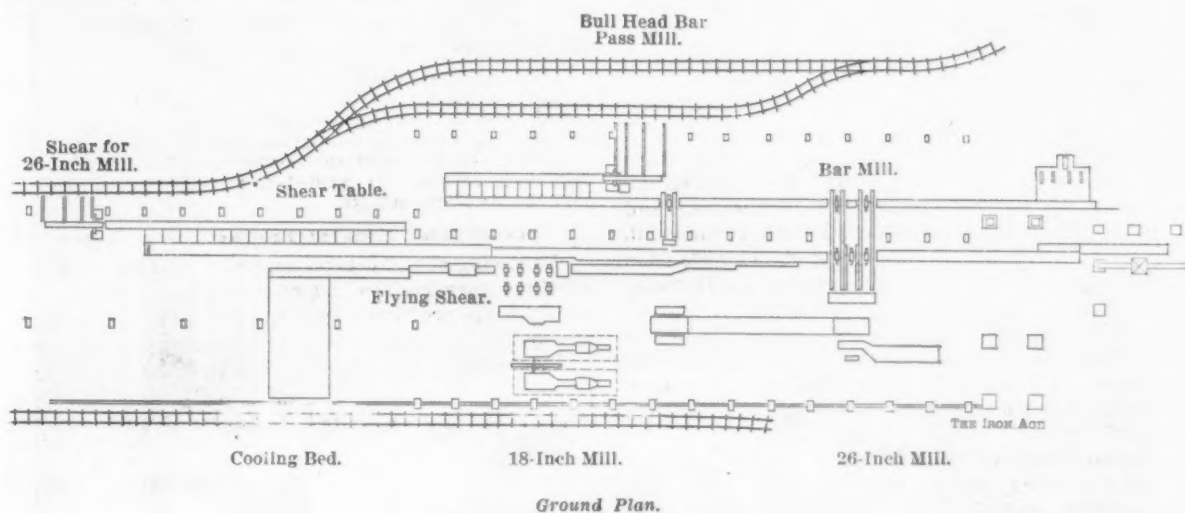
C. A. C. J.

The Crucible Steel Company of America have under construction a steel and brick warehouse in the rear of their present building on Clinton street, Chicago. The new structure will be three stories in high, but is designed to carry two additional stories some time in the future. The company contemplate the remodeling of the present Clinton street house to conform to the design of the addition now being built, which is 50 feet

The New Republic Billet Mill.

The new billet mill of the Republic Iron & Steel Company at Youngstown, Ohio, serves the numerous finishing plants of that company, and is therefore called upon to supply a wider range of sizes than is usually available in the open market. It embodies many features of interest and is remarkable both for the reduction of labor to a minimum and for its capacity. It has been in operation since the beginning of April of this year. It is placed in line with the Bessemer plant, a description of which was published in *The Iron Age* of October 11, 1900. The relative location of the billet mill to the Bessemer plant is such that the bloom from the blooming mill of the Bessemer plant is conveyed by means of roller tables directly into the billet mill.

It consists of three separate rolling mills, the accompanying plan, Fig. 1, showing the general arrangement. The first mill is a 26-inch semicontinuous mill, used for rolling the bloom into 4-inch or 3-inch billets, and is driven direct by a Tod engine. The second is an 18-inch continuous billet mill which receives the 3-inch billet from the semicontinuous mill and rolls it into $1\frac{1}{2}$, $1\frac{3}{4}$, 2 or $2\frac{1}{4}$ inch billets. It is driven by a Filer & Stowell engine. The third is a tandem bar or slabbing mill, used for rolling flat bars from slabs furnished by the blooming mill.



THE NEW REPUBLIC BILLET MILL.

square. The floor of the basement will be of asphalt. Special care has been exercised by the architect and by Manager E. T. Clarage, under whose direction the new building is being erected, to provide for more than ample strength to carry the immense tonnage which must be sustained by the new structure. It is possible that when the new building is completed one of the other two warehouses now utilized by the company may be abandoned.

Through differences arising between the iron workers and carpenters as to the erection of a crane at the Rock Island & Lake Shore Depot which is under construction work has ceased upon four important buildings at Chicago. Through the Advisory Board of the building trades a sympathetic strike was ordered on Monday which has caused suspension of work on the new Post Office, the Rock Island Depot, the Butler Building and the Hibbard, Spencer & Barlett Building. The total contract prices of these various buildings amounts to \$9,000,000. Many of the large contractors are reported to be considering plans which involve a settlement of the differences with the Advisory Board of the building trades.

The Inland mill of the Republic Iron & Steel Company and the rolling mill of the Emlyn Iron & Steel Works, both at East Chicago, were closed down the latter part of last week. The shut down will be utilized by the Emlyn Company to make some repairs which will probably increase the capacity and efficiency of the mill.

Two of the stands are driven direct by the Tod engine, while the bull head pass is driven by a rope drive from the same engine.

Beginning with the 26-inch semicontinuous mill, a view of the front of the train is shown in Fig. 2. The mill consists of three stands of two-high rolls. The first and third stands of these rolls rotate in the same direction and constitute the continuous part of the train. The middle stand of rolls rotates in the opposite direction. This is driven direct by the engine shaft, while the two others are operated through gearing from the main shaft. The bloom to be rolled when entering this mill therefore receives two continuous passes when running forward, in the first and third stands of rolls. When running backward it receives a single pass in the middle stand. To roll a 4-inch billet from a $7\frac{1}{2}$ -inch bloom the piece must pass through the mill three times, forward with two passes, backward with one pass, and forward again with two passes. A stand has been provided in line with the bull head pass of the slabbing mill, but has not been used.

When rolling a 3-inch billet, either as a final product or for the 18-inch continuous mill, the bloom passes through the 26-inch semicontinuous mill five times.

Automatic tables located front and back of the 26-inch semicontinuous mill, which are provided with specially designed hydraulically operated manipulators, take care of the proper handling of the material being rolled.

The production of this 26-inch semicontinuous mill either is shipped as 3 or 4 inch billets or it is delivered

to the 18-inch continuous mill to be rolled to smaller sizes. In the former case the billet is conveyed to the shear table, located at the end of the building in line with the 26-inch mill. This shear table consists of a receiving table and a shear table. At the end of the latter is located a Mackintosh-Hemphill steam shear, shown in the distance to the right in Fig. 6. Beyond the shear are located the scrap conveyor and a hydraulically operated billet conveyor for loading billets into cars.

When the 3-inch billet produced by the 26-inch mill is to be rolled down further it is deflected by a switch to an 18-inch continuous train. The lower end of the 26-inch table and the switch, together with the shear in front of the 18-inch train, are shown in Fig. 3.

The engine which drives the 26-inch semicontinuous train was built by the William Tod Company of Youngs-

The 18-inch continuous mill is driven by a horizontal cross compound engine built by the Filer & Stowell Company of Milwaukee, Wis. This engine has 42 and 84 inch cylinders and a 60-inch stroke, and is run at a speed of 70 revolutions with steam at 150 pounds. Special arrangements are provided for collecting the oil into an oil filtering tank, from which the oil is pumped back upon the bearings. For both engines a Wheeler surface condensing plant is provided. The boiler plant is now being enlarged by 2500 horse-power of Stirling boilers, Roney stokers and Heyl & Patterson coal conveyors.

All the roll tables are driven by electric motors.

The third slabbing or bar mill is provided so as to roll a thin bar when desired. The slab as it comes from the blooming mill direct is transferred so as to be in line with this bar mill, which is driven by the Tod en-

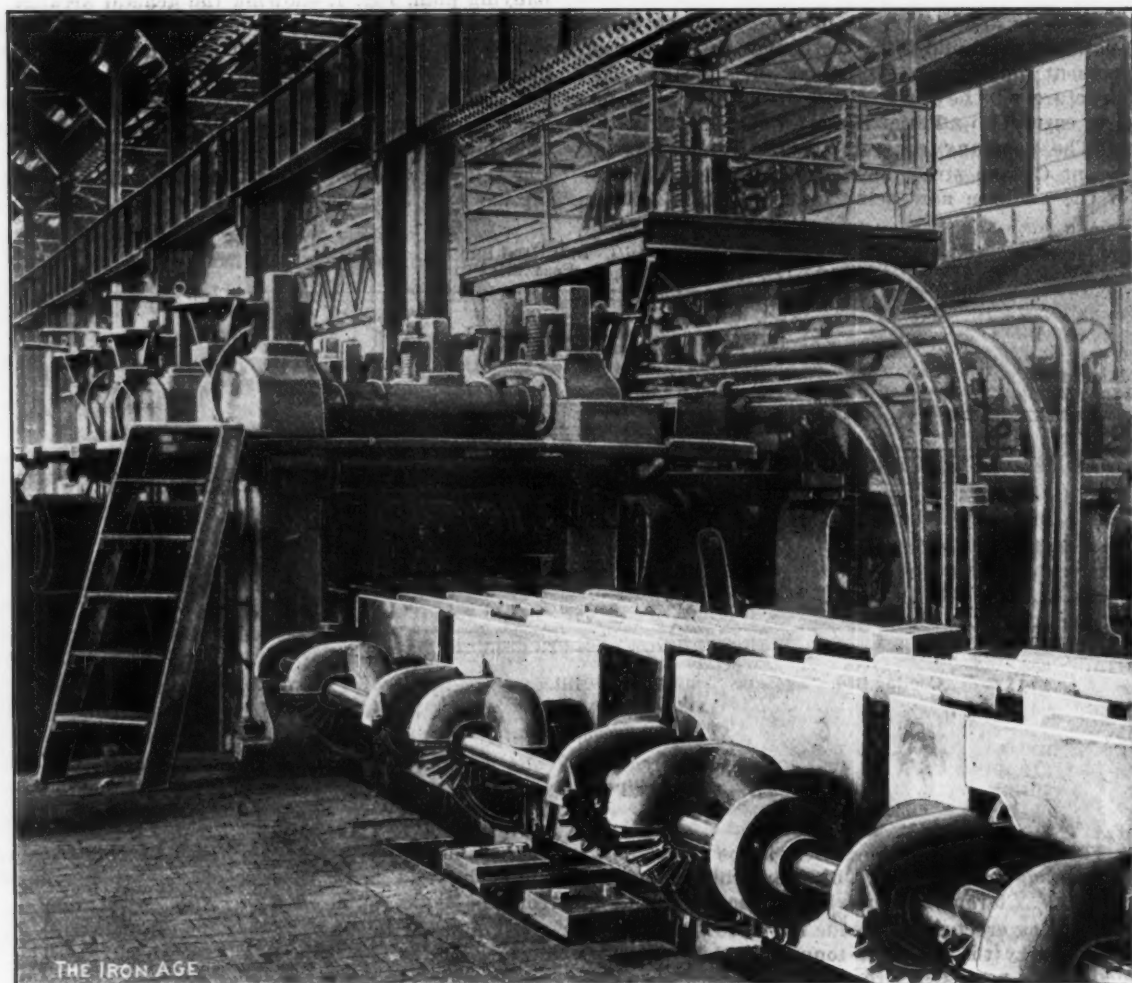


Fig. 2.—Front of 26-Inch Semicontinuous Mill.

THE NEW REPUBLIC BILLET MILL.

town. It is a tandem compound engine with 40 and 82 inch cylinders and 60-inch stroke, running with a speed of 80 revolutions with 150 pounds steam pressure.

The 3-inch billet as it is delivered from the 26-inch train is first cropped by a Lloyd Booth hydraulic billet shear before it enters the 18-inch continuous mill, which is shown in Fig. 4. This mill consists of four stands of rolls, provided with passes to roll $1\frac{1}{2}$, $1\frac{3}{4}$, 2 and $2\frac{1}{4}$ inch billets. Beyond this mill and in line with it is located an Edwards flying steam shear, shown in Fig. 5. This is used to shear the billets coming from the mill into 15 or 30 foot lengths. The billets after they are sheared pass onto a skew table, where skew rollers assemble them side by side so that each succeeding bar does not interfere with the others. A number of bars in a body pass to a table in front of the cooling bed, upon which they are pushed, to be finally loaded into cars.

Billet scrap is handled by a push off, shown in Fig. 7, to be loaded into specially designed cars.

The first two stands of rolls are so arranged that the bar may receive two or four passes according to the width of the bar. After it has passed through the bull head pass placed beyond, the bar runs out on a receiving table, from which it is transferred to the shear table. The Mackintosh-Hemphill shear is located at the end of the shear table. Beyond the shear are provided a scrap conveyor and mechanism for loading the sheared bars into cars.

The entire plant was designed by S. V. Huber & Co. of Pittsburgh, Pa., who have patents covering the main features.

The capacity of this new billet mill has never been seriously tested because the Bessemer works are unable to furnish the needed tonnage of blooms. The only approach to it has been that 36 ingots have been rolled in one hour. Comprehensive plans are now being carried out to balance the plant. The two 5-ton Bessemer converters, which are now unable to furnish the steel, are

to be replaced by two 10-ton converters, from which steel will be cast into four ingots 20 x 22 inches at the

Company are now building blowing engines, which are to have 46 and 88 inch steam cylinders, with 60-inch

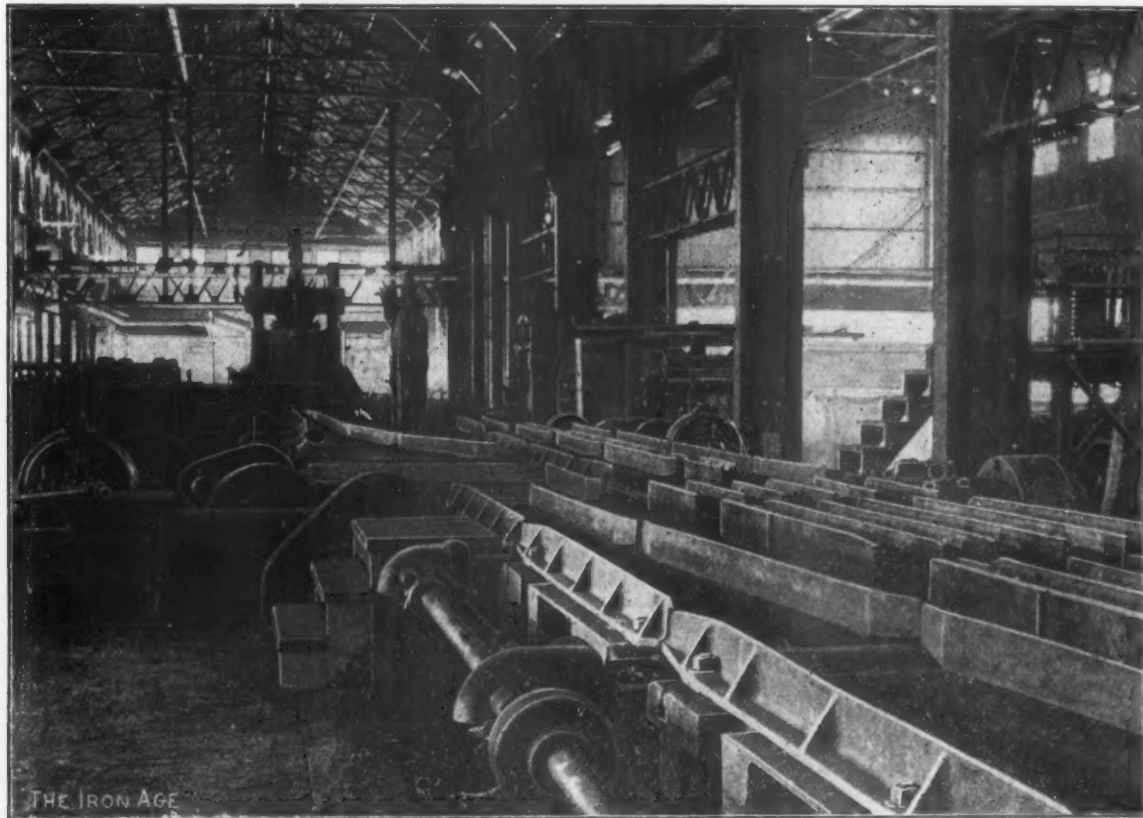


Fig. 3.—Lower End of 26-Inch Mill, Transfer Table and Switch.

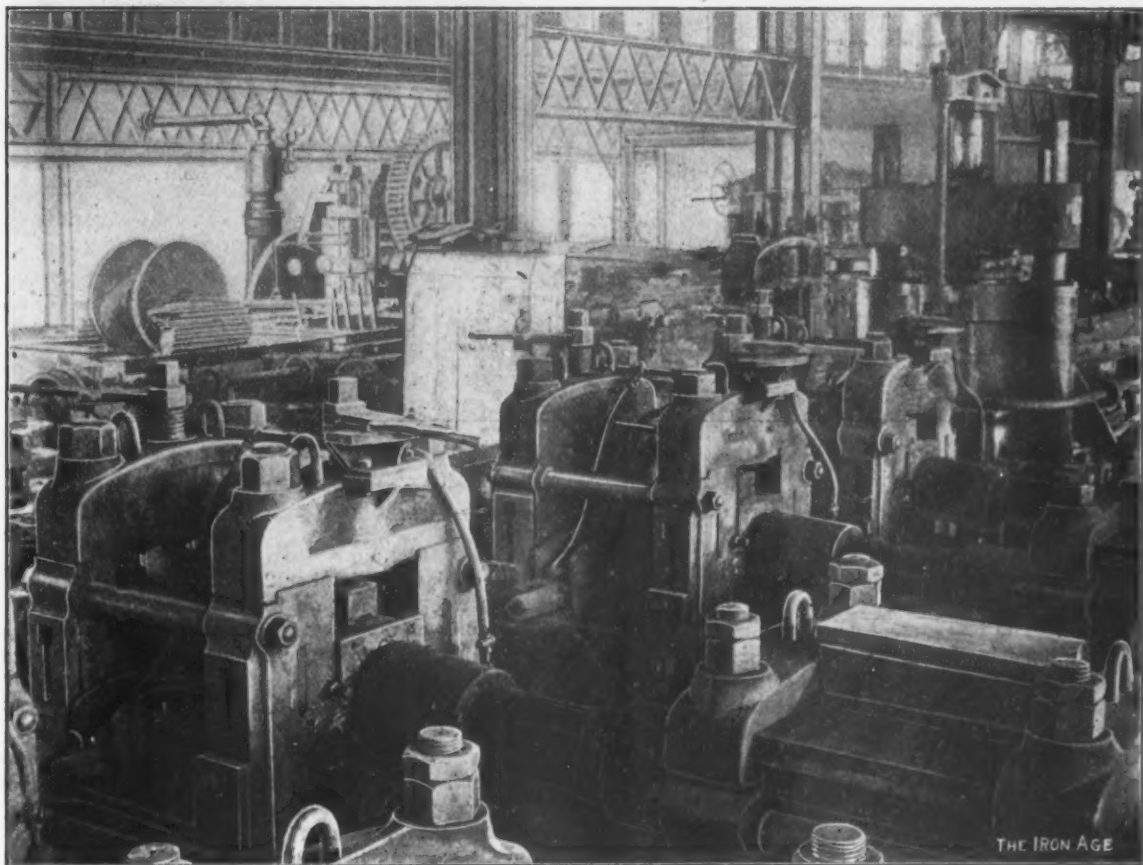


Fig. 4.—View of 18-Inch Mill from Platform.

THE NEW REPUBLIC BILLET MILL.

butt. Contracts for them have been placed with the New Castle Engineering Company of New Castle, Pa. Since the blowing power is inadequate, the Allis-Chalmers

stroke. The blowing tubs, equipped with Kennedy valves, are to have 76 inches effective.

A third soaking pit furnace has just been completed.

The present 32-inch blooming train is to be replaced by a 40-inch train for which the Lloyd-Booth Department of the United Engineering & Foundry Company has the contract. This new train is to be driven by a 54 x 66 inch blooming mill engine, which the William Tod Company of Youngstown, Ohio, are now building.

The new mill will be equipped with 3150 horsepower Stirling boilers, with Roney stokers and with coal conveyors, to be furnished by Heyl & Patterson of Pittsburgh.

It is believed that when these improvements are completed the new billet mill will develop a capacity of at least 1800 tons per working day.

The general manager of the works, who has also

Patents and the Industrial Arts.

Continuing our extracts from Census Bulletin No. 242, presenting a report on "Patents in Relation to Manufactures" by Story B. Ladd, we give the following interesting summary of patents relating to engineering:

Bridges.—In this class 1059 patents have been issued. The iron cantilever truss bridge is a product of comparatively recent invention. The St. Louis and other bridges across the Mississippi and the Poughkeepsie bridge across the Hudson are good examples of this, which may be found detailed in patents to Bender, Latrobe and Smith, 141,310, July 29, 1873; Eads, 142,378-142,382, in-



Fig. 5.—The Flying Shear at the End of the 18-Inch Mill.

THE NEW REPUBLIC BILLET MILL.

charge of the blast furnace department of the Valley furnaces of the Republic Iron & Steel Company, is Charles Hart. The mechanical department of the billet mill is in the hands of W. R. Edwards.

In close proximity to the new mill the Brown-Bonell works of the Republic Iron & Steel Company are building a new plant to take care of a good share of the product of the billet mill. This plant will consist of a Morgan continuous roughing train and of two Belgian mills, one a 7-inch and the other an 8-inch mill.

The Maryland Rail Company.—The Maryland Rail Company of Cumberland, Md., have placed in operation their new mill and are making 16, 20, 25 and 30 pound section steel T rails. The capacity is 100 tons per day. The mill was built especially for rolling rails and contains all modern equipment.

clusive, of date September 2, 1873, and Clarke, 504,559, September 5, 1893.

The construction of the Chicago drainage canal and of the Chicago River improvements stimulated invention in the line of bascule bridges. See patents to Vent, 652,201, June 19, 1900; Waddell, 661,113, November 6, 1900, and Keller, 685,767, November 5, 1901.

Excavating and Dredging.—In this class 2708 patents have been issued. In the dipper system important inventions, looking to better mastery of very hard material and quick movements of the bucket, are exhibited in patents to Osgood, 196,378, October 23, 1877, and 297,287, April 22, 1884, and King, 460,973, October 13, 1891. In dredging by the hydraulic system—i. e., severing or disintegrating the material by a cutter and pumping it up in suspension in water and similarly forcing it through pipes to a distant point of discharge, important inventions appear in patents 185,600, December 19, 1876; 277,177,

May 8, 1883; 300,333, June 10, 1884, all to Von Schmidt
et al.; 318,850, May 26, 1885, and 484,763, October 18, 1892,

The system of dredging by clam shell dredges has
 been improved by the direct application of fluid pressure

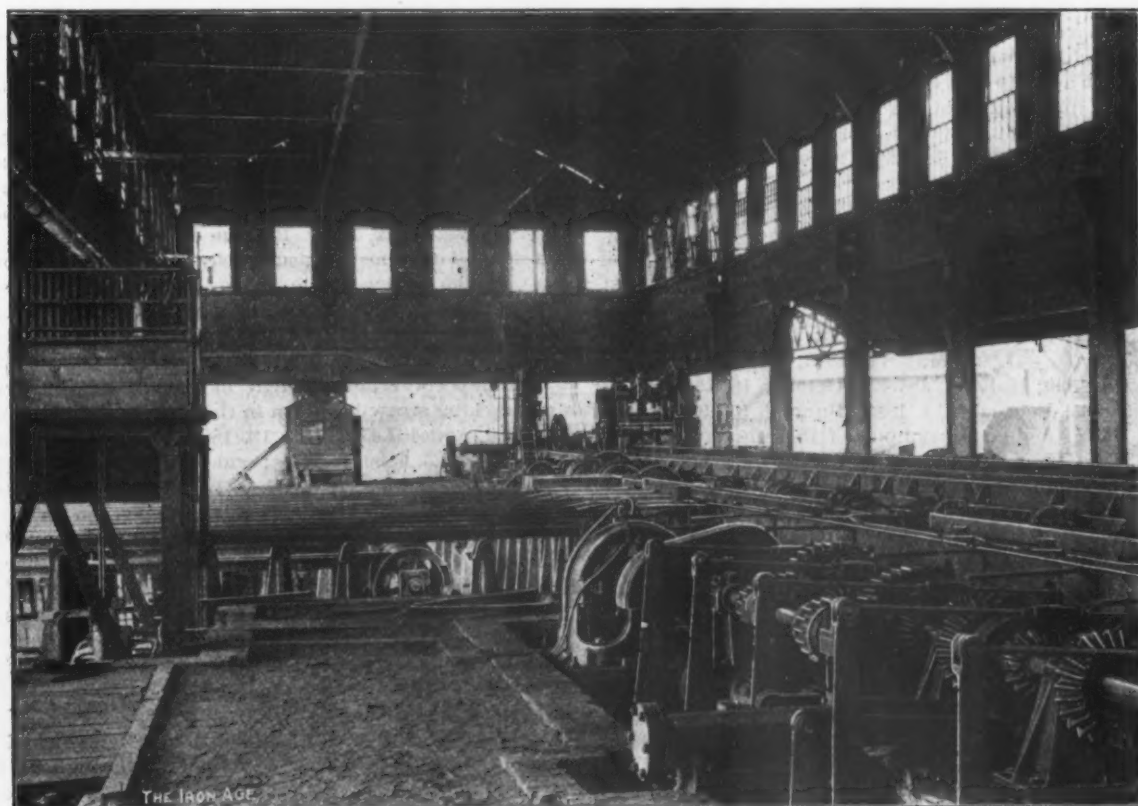


Fig. 6.—Cooling Table of 18-Inch Mill, also Skew Table. In the Distance is the 4-Inch Billet Shear.

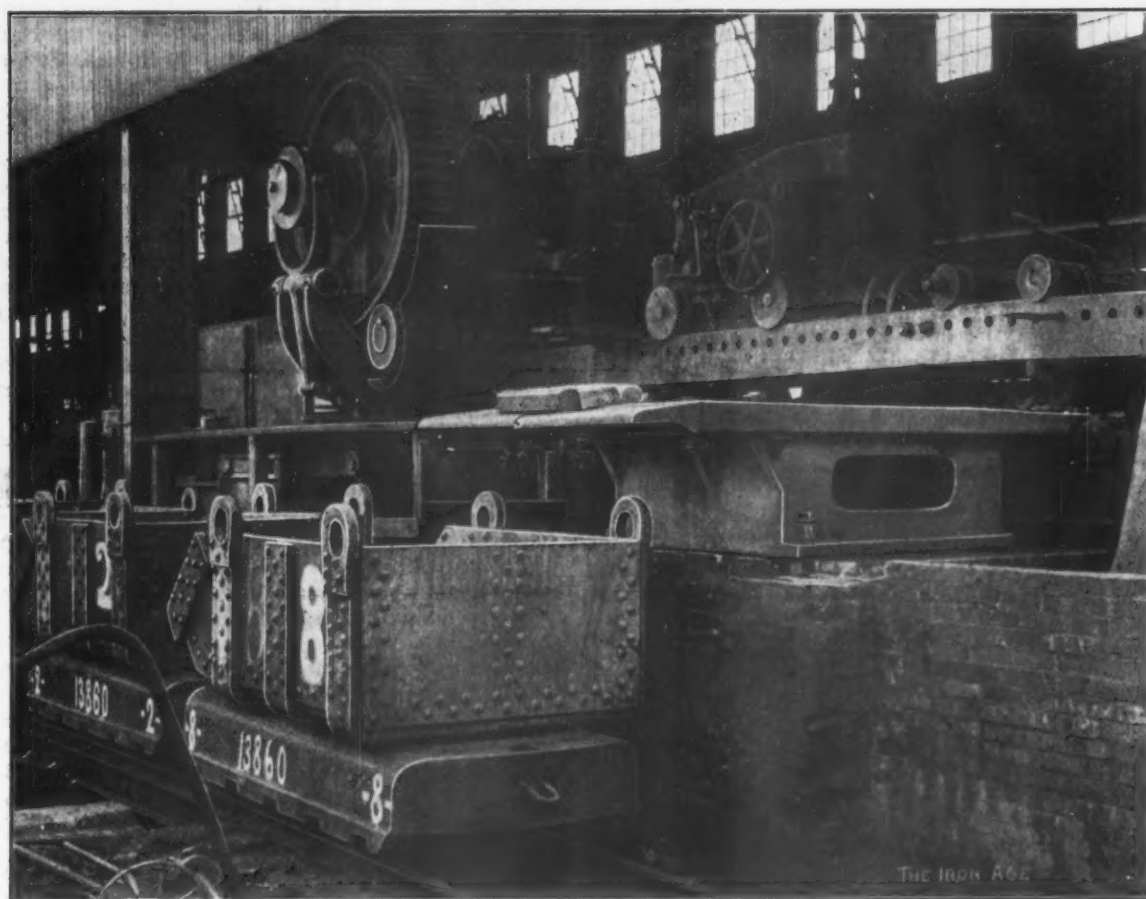


Fig. 7.—The Push Off.

THE NEW REPUBLIC BILLET MILL.

both to Bowers. The Bowers system has been applied in
 battery fashion by Bates' patent, 545,762, September 3,
 1895, and is largely employed by the Government.

to close the bucket, examples of such construction being
 shown in patents 198,957, January 8, 1878, to Symonds;
 514,788, February 13, 1894, to Symonds, and an example

of differential application of the power in patent 11,476, reissue, March 5, 1895, to Pless.

In wheeled scoops for excavating and removing earth very great activity has existed, and the output of them has been immense. Patents to Hubbard, 332,532, December 15, 1885; Hubbard, 359,537, March 15, 1887; Rathbun, 401,658, April 16, 1889; Brooks, 481,160, August 23, 1892; Deevy, 506,212, October 10, 1893, reissued 11,468, January 29, 1895; Kilborn, 513,464, January 23, 1894, are good examples of progress in this line.

In machines for finishing and repairing roads the activity and advance has been as great as in the last mentioned class. Patents to Pennock, 270,693, January 16, 1883, and 315,541, April 14, 1885; Taft, 315,184, April 7, 1885; Taft, 341,609, May 11, 1886; Fleming, 433,780, August 5, 1890; Holland, 484,429, October 18, 1892; Kimball, 491,565, February 14, 1893; Bunnell, 511,997, January 2, 1894, show good examples of these inventions.

Iron Buildings.—In this class 914 patents have been issued. Patents to Coffin, 477,925, June 28, 1892; Larimer, 485,870, November 8, 1892; Stearns, 495,070, April 11, 1893; Cornell, 523,425, July 24, 1894, record innovations in edifices consisting of a steel skeleton and tile casing. Green in his patent, 466,033, December 29, 1891, presents a marked improvement in book stacks for public libraries. Patents to Kinnear, 382,092-382,094, inclusive, May 1, 1888; Kinnear, 443,322-443,324, inclusive, December 23, 1890; Northrop, 301,260, July 1, 1884, and Northrop, 330,915-330,917, November 24, 1885, mark advance in interior wall and ceiling finish of embossed sheet metal. A similar valuable improvement is the metal facing of exterior walls of buildings, for which patents 381,000, April 10, 1888, Determann; 433,217, July 29, 1890, Sagendorph; 483,163, September 27, 1892, Pruden; 520,137, May 22, 1894, Deslauriers, have been granted.

Caisson work, as applied in setting foundations for the modern "tall building," has been practically improved by Washington. See patents 633,298, September 19, 1899, and 655,532, August 7, 1900.

The evolution of the "tall building" has induced extensive study of means and methods for obtaining the maximum strength and stability with the minimum of weight and of space occupied. Constructions (a) in concrete and metal are found in patents to Jackson, 621,091, March 14, 1899; Norcross, 596,534, January 4, 1898, and Orr, 644,939 and 644,940, March 6, 1900; (b) in tile and metal, in 650,072 and 650,073, to Buente, May 22, 1900, and 663,060, December 4, 1900, to the same.

The tile and metal principle is being applied in the construction of very large fire proof grain elevators. This is a great step in advance. See patents to Johnson, 661,323, December 18, 1900, and 683,441, 683,442, 683,443, to Cooley, October 1, 1901.

The same or even greater necessity exists to make the partitions of the "tall buildings" light, thin and strong. This has been done (a) in metal wired concrete by Orr, patents 550,801, December 3, 1895; 675,403, June 4, 1901; 681,728, September 3, 1901; and Mimmelmwright, 687,700, September 3, 1901, and (b) in tile, by Orr, 598,481, February 1, 1898; Liebau, 564,205, July 21, 1896, and Bell, 640,526, June 2, 1900.

Conveyors.—In this class 1796 patents have been issued. A most important advance in the handling and storage of coal is shown by the patents to Dodge, 408,957, August 13, 1889; 443,605, December 30, 1890; 453,966, June 9, 1891; 503,409, August 15, 1893; 539,250, May 14, 1895.

The immense steam generating plants of to-day require mechanical stoking, and that demands the most efficient appliances for passing coal. This we find illustrated in patents to Dodge, 565,334, August 4, 1896, and 667,975, February 12, 1901; Hunt and King, 631,718, August 22, 1899; Frith, 620,298, February 28, 1899, and 690,518, January 7, 1902.

Also in the transfer of ore or coal from the vessel to the docks the element of time has led to the application of high power to the lifting of immense bulks and weights at once. See patents to Hoover and Mason, 679,475 and 679,505, July 30, 1901. The same conditions call for mechanical appliances to gather the material from the remoter parts of the ship's hold to below the

hatches. Hand shoveling is too slow and expensive. See patents to Hulett, 606,720, July 5, 1898, and 679,967, August 6, 1901.

Again, the same conditions have led to the dumping of coal or ore direct from the car into the hold of the vessel—patents to Hulett (reissue), 11,494, May 7, 1895, and with a minimum of breakage in the process, patent to McMyler, 558,200, April 14, 1896; the latter result aided by an intermediate step. See patent to Hulett, 631,717, August 22, 1899. But the coaling of ships is apparently done most expeditiously by what is known here as the rotary tippie, or in England as the oscillating tippler. See as instances of this type patents to Long, 560,727, May 26, 1896, and 651,371, June 12, 1900.

An important development in the art of conveying and stacking straw is shown in the patents 297,561, April 29, 1884, and 467,476, June 19, 1892, to Buchanan; 424,433, March 25, 1890, to Ross; and 537,691, April 16, 1895, and 569,504, October 13, 1896, to Landis. Patent 545,013, August 20, 1895, to Dodge, is most interesting, as showing the application of the air blast for general conveying purposes. While a trough is shown, the material hardly touches the trough, but rests upon a film of air.

The mechanical distribution of grain to all parts of the grain car has received large attention. See patents to Phillips and Hunt, 570,880, November 3, 1896; Reynolds, 614,891, November 29, 1898, and Skillin, 619,799, February 21, 1899.

Clutches and Gears.—In the class of clutches 1314 patents have been issued. Although throughout the class of clutches there have been important improvements, yet the only radical advance in the art is manifested in the magnetic and fluid forms. Prior to 1880 there was no magnetic clutch. In 1881 a British patent, No. 200, was granted to one Imray, which shows the first attempt in this line. This was followed by the United States patent to McLaughlin, 432,209, July 15, 1890, and that to Veeder, 439,213, October 28, 1890, wherein are disclosed magnetic or electric clutches acting to produce a positive binding frictional contact. Willans in his patent, 473,042, April 19, 1872, went a step further by producing a clutch which performs all the functions of a clutch, but without the usual frictional contact. Hence in the later form there is absolutely no wear of the clutch parts, since there is no contact. There have been 19 patents issued for magnetic clutches. The first fluid clutch of which there exists any record is that patented to Drayton, 235,732, December 21, 1880. Instead of relying upon the constantly decreasing power of mechanical elements to create frictional contact a fluid under pressure is employed. This principle was developed by Hartness, 541,483, June 25, 1895. See also Stone, 663,396, December 4, 1900.

In the Stone patent the power is transmitted from one shaft to another by expanding a split ring carried by one shaft within a flange carried by the other. The expansion of the split ring is effected by means of a hydraulic cylinder and piston coupled to one end of a pivoted lever, the ends of the split ring being connected to the lever by links arranged on opposite sides of the pivot. Another form of clutch is shown in Rogers and Chadwick, 659,379, October 9, 1900. In this device the driving and driven elements are coupled by means of a split ring, spread by a lever arranged to be acted on by a cam on the driving shaft. The following peculiarities will be noticed in this device:

The driven element can travel faster than and independently of the driving element;

That increased speed of the driven element automatically uncouples the parts and coupling will be again effected by reduction of speed of the driven element to that of the driver;

That reversing the motion of the driving shaft when the driven element is moving forward causes the parts to act as a brake; and

That increased resistance to movement causes the parts to be gripped more firmly.

The fluid clutch patents number 30.

The patent to Boyd and West, 680,688, August 20, 1901, illustrates a new departure in the structure of gear teeth, in which a steel plate is located in the center

of each tooth, by which means the tooth increases in hardness toward the center. Thus as two such coacting gears wear toward an accurate mesh the bearing surface of the teeth becomes harder.

An illustration of change speed gearing is the patent to Schellenbach, 667,406, February 5, 1901. In this device a rotatable casing supports two gear wheels, around which and meshing therewith are also carried nine pinions, any one of which may be clutched to the driven shaft, and also any one of said pinions may be operatively connected to the driving shaft. By this mechanism 81 different speeds may be obtained in the driven shaft.

The patent to Shattuck, 682,391, September 10, 1901, belongs to another type of transmission gearing, in which a pinion on a driven shaft is made to engage with any one of a set of toothed gears of gradually smaller diameters or stepped gears. In order, however, to obviate the abrupt change from one speed to another the cone of gears is divided longitudinally into two halves. By means of switches and an operating lever the two halves may be made to slide longitudinally and laterally to such an extent that the driven pinion will run smoothly from one half of any gear to the corresponding half of the next smaller or larger gear, as desired, after which the parts return again to their normal positions, sliding the pinion laterally upon its shaft. Thus the pinion may be caused to run smoothly from the highest to the lowest gear, or *vice versa*, producing a variety of speeds in succession without occasioning any sudden jar in the driven part.

The patent to Barnard, 696,301, March 25, 1902, illustrates a very ingenious method of transmitting power by means of differential gears. Hitherto one member of a differential train has been held by brake mechanism to serve as a fulcrum. In this device, however, the fulcrum member is retarded by causing it to perform useful work. For example, power being applied to the first member of the train, and the second member being directly connected with the front axle of a street car or motor vehicle, the third member may be connected with a dynamo and made to generate a current of electricity to operate a motor on the rear axle of the vehicle. It will thus be seen that the power imparted to the first member is divided into two always equal parts, each of which performs independent work, and by varying the load imposed upon one part, as by various kinds of resistance, the work performed by the other part is also made to vary.

Cranes and Derricks.—In this class 777 patents have been issued. Good examples of cranes are found in the following patents: 290,260, December 18, 1883, Morgan, Sr.; 475,883, May 31, 1892, Morgan and Morgan; 478,803, July 12, 1892, and 496,427, May 2, 1893, Morgan.

Elevators.—In this class 2217 patents have been issued. The patent to Bassett, 332,776, December 22, 1885, illustrates a type of elevator controller in which the controller cable is operated by means of a lever or wheel inside of the car. There is a class of devices in which the controller rope is so connected as to move with the car. This is illustrated in the patent to Reynolds, 317,202, May 5, 1885. Rowntree, 693,908, February 25, 1902, shows a running controller rope the speed of which is less than that of the car. Patents to Fraser, 610,481, September 6, 1898, and 616,096, December 20, 1898, show means whereby an endless cable determines the relative directions and speeds of the car and counterweight according to the rates of speed of two independent power pulleys over which independent bights of the cable operate.

There are many safety devices and they are very diverse in their nature. Typical ones are referred to below. The patent to Sawyer, 231,743, August 30, 1880, shows electrical means for locking the controller rope when any door of the elevator shaft is open. The reissue patent, 11,520, to Harkness, shows means for locking a controller handle in the car when the door of the elevator shaft is open.

Likewise in Otis and Sundt, 687,775, December 3, 1901, the controller is locked when any well door is open or unlocked, and it is impossible to open any door until the car is adjacent thereto.

The patent to Guild, 213,565, March 25, 1879, shows means for stopping an elevator when the car meets with an obstruction. The patent to Walker, 407,626, July 23, 1889, shows means for preventing the crushing by the car of a foot which might be projected slightly beyond the floor of the car or one of the floors of the building. Patent 497,431, McGill, May 16, 1893, provides means whereby the position of the elevator and the direction of its movements may be observed at any floor.

Patent to Harold Rowntree, 693,907, February 25, 1902, is for an improvement in safety devices, having means for automatically varying the speed at which the safety grips are actuated.

A difficult problem in devices to prevent the fall of a car is to secure promptness and certainty of action of the devices without unnecessary shock by sudden stoppage. One means for accomplishing this result, and the one employed on the elevator in the Washington Monument, was patented by Pratt, 676,152, January 11, 1901.

Much improvement has been made in the line of automatic means for operating well doors by devices connected with the elevator car. In patent to Bitner, 676,833, June 18, 1901, a friction rail on the well door is operated by a friction wheel to open and close the door as the car approaches and leaves the landing, and means are employed whereby the speed of the door is reduced to prevent shock as the limit of its movement is reached.

The modern tall building has emphasized the necessity of absolutely perfect control of the winding drums. The lowering no less than the hoisting must needs be by positive engine power. This feature is developed in patents to Eades and Matthews, 602,312, April 12, 1898; Voss, 681,489, August 27, 1901, and Beck, 697,393, April 8, 1902. Patent 258,668, Paine, May 30, 1882, provides means whereby mail matter may be deposited or received at any floor of a building. Means were also provided to indicate the arrival of the mail box at the floor. Patent 517,619, Morgan, April 3, 1894, provides the ordinary passenger elevator car with a mail receptacle which automatically takes mail matter from boxes at the various floors as well as deposits mail matter in such boxes.

Pulleys.—In this subclass 1027 patents have been issued. Patent 469,338, Walker, February 23, 1892, covers a radical departure in drums for driving the cables of cable railways. The invention consists of making the cable grooves in peripheral rings adapted to turn independently of the drum, whereby the cable is automatically tensioned with the varying loads as cars are put on or taken off the line. Patents 260,462, Dodge and Philion, July 4, 1882, and 351,064, McNeal, October 19, 1886, are two of the first practicable split wooden pulleys.

Patent 603,067, Reeves, April 26, 1898, is an improvement on speed varying mechanisms in which two expansible pulleys are employed which may be so changed while the apparatus is in operation that the speed of a machine belted thereto may be varied while the speed of the line shaft remains constant, or whereby the countershaft speed can be altered without stopping the shaft or the machine driven, and whereby a uniform tension may be maintained on the driving belt.

Patent 641,281, Edison and Johnson, January 16, 1900, is an improvement on expansible pulleys whereby provision is made for tightening the belt on the expansible pulleys by adjusting one of the shafts toward and from the other.

The New Youngstown Skelp Mill.—A week since the work of placing the machinery in the splendid new skelp mill of the Youngstown Iron, Steel & Tube Mill of Youngstown, Ohio, was begun, and very rapid progress has been made with its installation. In fact, it is believed that in four weeks it will be possible to test the machinery. The mill represents a new departure in skelp rolling. There will be a roughing train with five passes driven by a tandem compound Tod engine, and in line with it, tandem, three stands of rolls. These will be driven by a second tandem compound Tod engine, running the second stand direct and the first stand and the bull head rolls by means of rope transmission. The mill building, a handsome structure, is 400 feet long and 70 feet wide.

The Iron Age

New York, Thursday, October 2, 1902.

DAVID WILLIAMS COMPANY,	-	-	-	-	-	-	-	-	-	PUBLISHERS.
CHARLES KIRCHHOFF,	-	-	-	-	-	-	-	-	-	EDITOR.
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JOHN S. KING,	-	-	-	-	-	-	-	-	-	BUSINESS MANAGER.

Peculiar Conditions in the Iron Trade.

The conditions prevailing in the iron trade are noteworthy. Ordinarily the various branches have a fairly intimate relationship with one another. It has seldom happened that any one branch has been overrun with work while others are suffering from overproduction. The demand is usually of a general character. If pig iron is active the causes leading to that activity are of a character to affect the market for the finished product through the entire line. On the other hand, if the pig iron trade is drooping and prices are weak it is quite unusual to find any line of finished iron and steel enjoying great activity. At present, however, pig iron, steel billets, steel rails and structural shapes are in such demand that the market cannot be adequately supplied from domestic sources and large purchases are being made abroad. In steel plates and merchant bars the facilities of the home mills are fully employed. But in wire rods, wire, merchant pipe, sheets and tin plates, evidences of overproduction are apparent. In the sheet and tin plate trade particularly the competition for business is keen, and numerous mills have been obliged to close until the demand increases sufficiently to warrant their resumption.

The coal miners' strike and the insufficiency of railroad motive power are responsible in part for this irregularity in condition. If all blast furnaces fit for operation were able to get the necessary fuel the situation in the pig iron trade would not be so acute, although it is quite possible that even then some iron might have to be imported. The rate of consumption at this time seems clearly to be somewhat in excess of the full furnace capacity. With regard to steel billets, steel rails and structural shapes no doubt exists as to our deficiency in capacity, which has been apparent for some time. In these lines new construction has not yet become effective to the extent of even equalizing the supply and demand. But in wire rods, wire, merchant pipe, sheets and tin plates special effort has been put forth in fresh ventures of capital and the productive capacity is in excess of immediate requirements.

It is fortunate for the stability of the trade in general that the excess in productive capacity is in the finishing end and not in pig iron and steel billets. The scarcity and high cost of material thus preclude any serious reduction in prices. The mill or factory in need of orders hesitates to sacrifice its capital to secure a share of business and therefore discontinues operations. This is the direct result of the policy of the large manufacturers who discouraged high prices for finished products, thus keeping margins of profit too small to permit a heavy cut. It is possible that the excellent crops of this year and the profitable prices prevailing for all agricultural products may not only prolong the general prosperity of the country, but so increase the consumption of manufactured products as to restore to activity the idle mills and factories. In the case of the tin plate works improved conditions are immediately promised as a result of the efforts to secure the business of consum-

ers who have been purchasing foreign tin plates to get the benefit of the drawback on their export trade. The other lines must depend on an enlarged home demand, and it is earnestly hoped that they will be thus favored.

The Change in Our Foreign Trade.

It is difficult to realize that our imports are now running much in excess of those in any previous period. We are apt when any decided change occurs to look on it as permanent, especially if the new condition continues for several years. Such a change took place in our import trade in 1893-4, when the hard times following the panic caused a heavy shrinkage in the purchase of foreign as well as domestic merchandise. For six years our imports were comparatively small, while our exports grew by leaps and bounds. Conditions abroad during that period were most propitious for our manufacturers as well as agricultural interests, and we seemed to be rapidly becoming general purveyors to the world. It is, in fact, but a few months since Europe was alarmed at the American invasion, as this country seemed to be in a peculiarly favorable position to sell largely in all markets and buy comparatively little in any. In the light of present happenings it appears almost ludicrous that so recently European statesmen were gravely discussing the imminent necessity of forming a trade alliance against the United States to prevent us from capturing so much of the trade of the world as to turn things topsy turvy. It was a remarkable experience and during the short time it lasted our manufacturers and merchants learned many useful lessons in export matters which may prove quite valuable. But we have turned another corner in the past year or two and our trade relations with other countries are assuming a different character. Our exports have diminished heavily, while our imports have grown almost correspondingly.

Such a complete change has taken place in conditions here and abroad that we are likely for some considerable time to import at a very heavy rate. For several successive months the value of our imports has surpassed all monthly records in our history, and if the coal miners' strike in this country does not soon terminate our foreign purchases of iron and steel will swell the totals of future months still more. Our prices are high, as a result of our long continued prosperity, and at the same time prices abroad are low because of the particularly severe depression in Germany. Our purchases are running up to huge figures in the very countries in which only two or three years since the utmost alarm was manifested regarding our encroachments in their markets. Never before have we taken so much from France as we are now getting, while Great Britain and Germany are finding us quite as good customers as in the best times of the past. The manufacturers and merchants of those countries may think this is too good to last long, but they should enjoy their unexpected good fortune while it does last.

The change which has thus taken place is making havoc with our favorable balance of trade. The values of our imports and exports are drawing closer together, and the monthly reports of the Bureau of Statistics no longer show the heavy balance in our favor which has been such a striking feature of these statements since 1894. For example, the figures for August which have just been issued show a balance in our favor for that month of only \$16,000,000, against \$35,000,000 in August of last year. While it seems unlikely that the course of our foreign trade will be so completely changed as

to show an excess of imports, yet that is not altogether improbable. In any event it could not occur until next spring, as our exports of cotton and breadstuffs are always so large in the fall and winter months as to insure a very comfortable balance in our favor. If by any mischance the outward movement of such products this fall should be light it might have unpleasant consequences financially, as our bankers have borrowed large sums abroad which they expect to pay with cotton and produce bills.

British Iron and Steel Manufacturers.

The subjoined list does not pretend to be exhaustive, but aims to give the names of the leading British iron and steel manufacturers. We have had numerous inquiries for this information, and it has been specially obtained for us by our English correspondent. It is needless to say that the list could be greatly expanded. A short list of merchants is also given to make the information more complete:

Pig Iron Makers.

James Bain & Co., Harrington, R.S.O., Cumberland.
William Baird & Co., Limited, 168 West George street, Glasgow.
Barrow Hematite Iron & Steel Company, Limited, Carnforth, Lancs.
Bell Bros., Limited, Zetland road, Middlesbrough.
Bolckow, Vaughan & Co., Limited, Middlesbrough Iron Works, Middlesbrough.
John Brown & Co., Limited, Atlas Works, Sheffield.
Brymbo Steel Company, Limited, Brymbo, Wrexham, North Wales.
Butterley Company, Limited, Butterley Iron Works, Derby.
Charles Cammell & Co., Limited, Cyclops Steel & Iron Works, Sheffield.
Cargo Fleet Iron Company, Limited, Cargo Fleet Iron Works, Middlesbrough.
Carlton Iron Company, Limited, Carlton Iron Works, Stillington, Ferry Hill, Co. Durham.
Carnforth Hematite Iron Company, Limited, Carnforth, Lancs.
Carron Company, Carron, R.S.O., Stirlingshire, Scotland.
Clay Lane Iron Company, Limited, 2 Station street, Saltburn-by-the-Sea.
Cochrane & Co., Limited, Ormesby Iron Works, Cargo Fleet, Middlesbrough.
Coltress Iron Company, Limited, Coltress Iron Works, Newmains, R.S.O., Lanarkshire, N. B.
Consett Iron Company, Limited, Blackhill, R.S.O., Co. Durham.
Darwen & Mostyn Iron Company, Limited, Mostyn, S.O., North Wales.
The Ebbw Vale Steel, Iron & Coal Company, Limited, Ebbw Vale, R.S.O., Mon.
The Glengarnock Iron & Steel Company, Limited, 127 St. Vincent street, Glasgow.
Madeley Court Iron Works, Madeley, R.S.O., Shropshire.
Merry & Cunningham, Limited, 127 St. Vincent street, Glasgow.
Millom & Askam Hematite Iron Company, Limited, Millom, S.O., Cumberland.
Moss Bay Hematite Iron & Steel Company, Limited, Workington.
Newton, Chambers & Co., Limited, Thorncliffe & Chapelton Iron Works, North Sheffield.
Normanby Iron Works Company, Limited, Cargo Fleet, Middlesbrough.
North Eastern Steel Company, Limited, West Marsh, Middlesbrough.
Sir B. Samuelson & Co., Limited, Newport Iron Works, Middlesbrough.
Seaton Carew Iron Company, Limited, Mainsforth Terrace, West Hartlepool.
Sheepbridge Coal & Iron Company, Limited, Sheepbridge Works, Chesterfield.
Shelton Iron, Steel & Coal Company, Limited, Stoke, Staffs.
Shotts Iron Company, Limited, 130 George street, Edinburgh.
Skinningrove Iron Company, Limited, Skinningrove, Carlin How, R.S.O., Yorks.
Staveley Coal & Iron Company, Limited, Staveley.
Weardale Steel, Coal & Coke Company, Limited, Tudhoe Iron Works, Spennymoor.
Whitehaven Hematite Iron & Steel Company, Limited, Cleator Moor, R.S.O., Cumberland.
William Whitwell & Co., Limited, Thornby Iron Works, Stockton-on-Tees.
Wigan Coal & Iron Company, Limited, Kirkless Hall, New Springs, Wigan.
Phillip Williams & Sons, Wednesbury Oak, Tipton.
Wilson, Pease & Co., Tees Iron Works, Middlesbrough.
Workington Hematite Iron & Steel Company, Limited, Workington.

Structural Iron and Steel Manufacturers.

Sir W. G. Armstrong, Whitworth & Co., Limited, Elswick Works, Newcastle-on-Tyne.

Sir William Arrol & Co., Limited, Dalmarock Iron Works, 241 Baltic street, Bridgeton, Glasgow.
Arrol's Bridge & Roof Company, Limited, Germiston Works, Springburn, Glasgow.
Ashmore, Benson, Pease & Co., Limited, Parkfield Works, Bowesfield Lane, Stockton-on-Tees.
Wm. Bain & Co., Lochrin Iron Works, Coatbridge, Lanarkshire, N. B.
Bolckow, Vaughan & Co., Limited, Dock street, Middlesbrough.
Cleveland Bridge & Engineering Company, Limited, Bank Top, Darlington.
Cochrane & Co., Woodside Iron Works, Dudley.
Archibald D. Dawney & Sons, Limited, East Moors, Cardiff.
Dorman, Long & Co., Limited, West Marsh, Middlesbrough.
Glossop Iron Works Company, Limited, Surrey street, Glossop, Derbyshire.
Head, Wrightson & Co., Limited, Teesdale Iron Works, Trafalgar street, Thornaby-on-Tees.
Horseley Company, Limited, Horseley Works, Tipton, Staffs.
J. & G. Joicey & Co., Forth Banks, Newcastle-on-Tyne.
E. C. & J. Keay, Limited, Prince's Chambers, Corporation St., Birmingham.
John Lysaght, Limited, Newport, Montreal.
Francis Morton & Co., Limited, Hamilton Iron Works, South Dock, Garston, Liverpool.
North Eastern Steel Company, Limited, West Marsh, Middlesbrough.
The Pearson & Knowles Coal & Iron Company, Limited, Dallam & Bewsey Forges, Warrington.
Tees Side Bridge & Engineering Works, Limited, Cargo Fleet, Middlesbrough.

Bessemer Billet and Bar Manufacturers.

John Bagnall & Son, Langley Forge, Oldbury.
Alfred Baldwin & Co., Limited, Pontypool.
Barrow Hematite Iron & Steel Company, Limited, Barrow, Lancs.
Bell Bros., Limited, Zetland Road, Middlesbrough.
Henry Bessemer & Co., Limited, Bessemer Steel Works, Sheffield.
Blackett, Hutton & Co., Cleveland Steel & Iron Works, Gulsborough, Yorks.
Bolckow, Vaughan & Co., Limited, Middlesbrough.
Brymbo Steel Company, Limited, Brymbo, North Wrexham, North Wales.
Benjamin Bunch & Sons, Staffordshire Iron Works, Walsall.
Charles Cammell & Co., Limited, Cyclops Steel & Iron Works, Sheffield.
Consett Iron Company, Limited, Consett, Co. Durham.
Crawshaw Bros. Cyfartha, Limited, Cyfartha Iron & Steel Works & Collieries, Merthyr Tydfil, South Wales.
Dorman, Long & Co., Limited, Middlesbrough.
James Fairley & Sons, Old Mint, Shadwell street, Birmingham.
The Glasgow Iron & Steel Company, Limited, 19 Waterloo street, Glasgow.
Glengarnock Iron & Steel Company, Limited, 127 St. Vincent street, Glasgow.
Grovesend Steel Company, Gorseon, R.S.O., Glamorganshire.
Lilleshall Company, Limited, Prior's Lee, near Shifnal, Salop.
North Eastern Steel Company, Limited, West Marsh, Middlesbrough.
Parkgate Iron & Steel Company, Limited, Parkgate, Rotherham.
Shelton Iron, Steel & Coal Company, Limited, Stoke-on-Trent.
South Durham Steel & Iron Company, Limited, Stockton-on-Tees.
The Steel Company of Scotland, Limited, 23 Royal Exchange square, Glasgow.
A. & J. Stewart & Menzies, Limited, 41 Oswald street, city, Glasgow.
Waverley Iron & Steel Company, Coatbridge, Lanarkshire, N. B.
Weardale Steel, Coal & Coke Company, Limited, Tudhoe Iron Works, Spennymoor, Co. Durham.
Wigan Coal & Iron Company, Limited, Brogden Street Chambers, Ulverston, Lancs.

Tin Plate Manufacturers.

The Aberavon Tin Plate Company, Limited, Aberavon, Port Talbot, South Wales.
The Abercarn Tin Plate Company, Limited, North Newport, Montreal.
Abertillery Iron & Tin Plate Works, Limited, Abertillery, R.S.O., Montreal.
Baglan Bay Tin Plate Company, Limited, Briton Ferry, R.S.O., South Wales.
E. P. & W. Baldwin, Limited, Wilden Works, Stourport, Worcester.
Beaufort Tin Plate Company, Morriston, R.S.O., Glamorganshire.
Blaena Iron & Tin Plate Company, Limited, Blaena, R.S.O., Montreal.
Cambria Tin Plate Company, Limited, Pontardulais, R.S.O., Glamorganshire.
Cwmfelin Steel & Tin Plate Company, Limited, Cwmbwrla, Swansea.
Dafen Tin Plate Company, Limited, Dafen Tin Plate Works, Llanelly, South Wales.
E. Davies & Sons, Ffwdwyllt Works, Port Talbot, South Wales.
Dynevor Tin Plate Company, Pantyffynnon, Ammanford, R.S.O., Carmarthenshire.
Eagle Tin Plate Company, Limited, Neath, South Wales.
Ely Tin Plate Company, Pontyclun, R.S.O., Glamorganshire.
Fairwood Tin Plate Company, Limited, Gowerton, R.S.O., Glamorganshire.

The Ferry Tin Plate Company, Limited, Ferry Works, Briton Ferry, R.S.O., South Wales.
 Foxhole Tin Plate Company, Llanisamet, R.S.O., Glamorgan-shire.
 W. Gilbertson & Co., Limited, Pontardawe, R.S.O., Glamorgan-shire.
 Glanrhyd Tin Plate Company, Pontardawe, R.S.O., Glamorgan-shire.
 Grovesend Tin Plate Company, Gorseinon, R.S.O., Glamorgan-shire.
 Gwynne & Co., Limited, Gwalla Works, Briton Ferry, R.S.O., South Wales.
 Knight & Crowther, Limited, Stour Vale Iron Works, Kidderminster.
 Melingriffith Company, Limited, Melin-Griffith Works, Whitchurch, Cardiff.
 Monmouth Steel & Tin Plate Company, Cambrian Chambers, Cambrian Road, Newport, Montreal.
 Morriston Tin Plate Company, Morriston, R.S.O., Glamorgan-shire.
 Old Castle Iron & Tin Plate Company, Limited, Llanelly, Carmarthenshire.
 Old Lodge Tin Plate Company, Limited, Llanelly, South Wales.
 The Park Tin Plate Company, Limited, Glanrafon Works, Clydach, R.S.O., Glamorganshire.
 Pontypool Works, Limited, Pontypool, Montreal.
 Redbrook Tin Plate Company, Limited, Pontnewydd, Newport, Montreal.
 Swansea Steel Company, Limited, Robertstown, Aberdare, South Wales.
 Richard Thomas & Co., Limited, Cwmbwrla, Swansea.
 Richard Thomas & Co., Limited, Lydney, Gloucestershire.
 Wyndham Thomas, Caldicot, Chepstow, Montreal.
 Waterhouse Brothers, Pentyrch and Taff's Well, Cardiff.
 Joshua Williams & Co., Limited, Aberdulais Tin Plate Works, Neath, South Wales.

Pig Iron Merchants.

Edgar Allen & Co., Limited, 58 South John street, Liverpool.
 Thomas Altham & Son, Albert Iron Works, Penrith.
 Arnett & Co., Lower Commercial street, Middlesbrough.
 Ashton Green Iron Company, 119 Victoria street, Bristol.
 Benjamin C. Atkinson, Post Office Chambers, Middlesbrough.
 Arthur Bainbridge, 5 Victoria Buildings, High street, Stockton-on-Tees.
 P. Baker & Co., 1 Dock Chambers, Cardiff.
 Thomas Baker, Ferry Road, Middlesbrough.
 Andrew Baxter, Whifflet Junction, Coatbridge, Lanarkshire.
 C. Behrens & Co., K. Exchange Buildings, Newcastle-on-Tyne.
 Ralph Bell & Co., 22 Foyle street, Sunderland.
 Charles Bell, 50 Wellington street, Glasgow.
 J. H. Bentham & Co., Side, Newcastle-on-Tyne.
 Birt & Co., 47a Strand, Swansea.
 W. Blenkinsop & Co., 1 Exchange place, Middlesbrough.
 Henry Campbell Booth, Royal Exchange, Middlesbrough.
 Bradley Bros., Dixon's Green, Dudley.
 A. G. Brown & Co., 342 Argyle street, Glasgow.
 Alfred Brown, 9 Lawson street, Barrow, Lancs.
 Bruce Lindsay Bros., 38 Constitution street, Leith, Edinburgh.
 T. A. Bulmer & Co., 16 New Exchange Buildings, Queen's square, Middlesbrough.
 James L. Busch & Co., 3 Queen's Terrace, Middlesbrough.
 Casebourne, Fowler & Co., 8 New Exchange Buildings, Queen's square, Middlesbrough.
 G. E. Casebourne & Co., 2 Wellington street, Stockton-on-Tees.
 John Chorley, Butter Market street, Warrington.
 William Clark & Co., 141 West George street, Glasgow.
 Connal & Co., Limited, 34 West George street, Glasgow.
 Cowle Bros. & Co., 196 St. Vincent street, Glasgow.
 John Crawford & Co., 16 St. Vincent street, Glasgow.
 James Dick, 93 Hope street, Glasgow.
 George Dimmack & Co., 75 Buchanan street, Glasgow.
 John Donald, Limited, 42 Cadogan street, Glasgow.
 Alexander Doughty & Co., Redcross Chambers, 11 Redcross street, Liverpool.
 Wm. Duncan & Co., Royal Exchange, Middlesbrough.
 Dunford & Elliott, Maritime Buildings, Newcastle-on-Tyne.
 J. & J. A. Dunn, 15 Blair street, Edinburgh.
 Thomas Edmondston & Son, 36 Commercial street, Edinburgh.
 Eekhout & Co., 92 West Nile street, Glasgow.
 R. Feldtmann & Co., 104 West George street, Glasgow.
 R. J. Forfar & Co., 29 Waterloo street, Glasgow.
 Fox Bros. & Pease, Post Office Buildings, Middlesbrough.
 Fox, Head & Co., 19 New Exchange Buildings, Queen's square, Middlesbrough.
 Gardiner, Barugh & Jones, 28 Waterhouse lane, Hull.
 Glengarnock Iron & Steel Company, Limited, Glengarnock, R.S.O., Ayrshire.
 Godwin, Warren, Fry & Co., 140 Redcliffe street, Bristol.
 Archibald S. Govan & Co., 24 St. Vincent place, Glasgow.
 Frank Graham & Co., Bank Chambers, Mosley street, Newcastle-on-Tyne.
 John Gunson, Strand street, Whitehaven.
 Hall & Pickles, 84 Port street, Manchester.
 Robert Hamilton, 18 Waterloo place, Edinburgh.
 Thos. Harris & Co., Limited, 1 Dock street, Middlesbrough.
 N. Hingley & Sons, Limited, Netherton Iron Works, Dudley.
 Hogg & Henderson, Zetland Building, Middlesbrough.
 J. P. Hornung & Son, Post Office Buildings, Middlesbrough.
 Humble & Thompson, 19 Queen street, Newcastle-on-Tyne.
 J. Huntrods & Co., Station Road, Workington.
 William Jacks & Co., 23 Royal Exchange square, Glasgow.
 Jaeger Bros., Cleveland Buildings, Middlesbrough.

E. F. Jarvis, Depot Road, Middlesbrough.
 Jervelund & Clephan, Zetland Road, Middlesbrough.
 A. G. Kildston & Co., 81 Great Clyde street, Glasgow.
 King & Co., Limited, South Church street, Hull.
 J. W. Kyle & Co., Post Office Chambers, Middlesbrough.
 Lander & Larsson, 164 Edmund street, Birmingham.
 Lawson, Mordaunt & Co., Limited, Commercial Buildings, Station Road, Workington.
 Wm. Lester & Sons, 11 West Regent street, Glasgow.
 Charles Lewis & Co., Liverpool Wharf, Newport, Montreal.
 Wm. H. Loveridge, 11 Victoria Terrace, West Hartlepool.
 Andrew A. McArd & Co., 5 Williamson lane, Tangier street, Whitehaven.
 P. & W. MacLellan, Limited, Clutha Works, Glasgow.
 Macnaughton Bros., 7p St. George's place, Glasgow.
 Thos. W. MacNay & Co., 13 Stockton street, Middlesbrough.
 Joseph Martin & Son, Apsley Buildings, Oldhall street, Liverpool.
 H. Mason & Co., Commercial Chambers, 96a High street, Stockton-on-Tees.
 Francis W. Mildred, Exchange place, Middlesbrough.
 James Morton & Sons, 8 Prince's square, Glasgow.
 Charles E. Muller & Co., Royal Exchange, Middlesbrough.
 Munro & Co., 1 Exchange place, Middlesbrough.
 John Needham & Sons, Needham's Chambers, Old Millgate, Manchester.
 Neilson Bros., 53 Bothwell street, Glasgow.
 R. I. Nicoll & Co., 95 Bath street, Glasgow.
 H. B. Pearce & Co., 156 Rolfe street, Smethwick, Birmingham.
 Hermann Ronnebeck, Post Office Chambers, Middlesbrough.
 Robert Russell, 14 Albert road, Middlesbrough.
 Charles Ryland & Son, Exchange Buildings, Stephenson place, Birmingham.
 Scott Bros., Limited, 46 Sandhill, Newcastle-on-Tyne.
 Shelton Iron, Steel & Coal Company, Limited, Stoke, Staffs.
 James T. Stewart, 79 West Regent street, Glasgow.
 Swan Brothers, 3 Exchange place, Middlesbrough.
 Vaughan & Dymond, Call's Buildings, Newcastle-on-Tyne.
 Wallis & Bigland, 6 New Exchange Buildings, Queen's square, Middlesbrough.
 Whitson & Co., 104 West George street, Glasgow.
 T. Wilson & Co., 121 Duke street, Barrow, Lancs.

The Malleable Iron Fittings Company.

The Malleable Iron Fittings Company, Branford, Conn., whose large works are located on the Shore Line Division of the New York, New Haven & Hartford Railroad and occupy a tract of land extending along the north side of the Branford River a little more than a mile in length, have extensive additions to their plant well under way.

The new galvanizing and tinning plant, a brick building 40 x 140 feet, with annex 30 x 20 feet, which will be used for a shipping room for their job galvanizing and tinning business, is expected to be ready for occupancy early in November. It is well lighted and ventilated and is provided with four large galvanizing kettles, which are served from the pickling tanks by overhead and surface tracks. Batches of work weighing 1500 pounds can be handled at one operation in these tanks. The tinning room is provided with four tin kettles and also with special rolling barrels for preparing gray iron castings for tinning, which work they make a special feature of, using the W. T. Flanders process described in "Galvanizing and Tinning," a book published by the David Williams Company. The plant is equipped in accordance with plans by Mr. Flanders, who will remain with the company in charge of this department, is a model of convenience in every particular and calculated to reduce the labor cost to a minimum.

The other enlargements consist of a two-story brick building, 80 x 200 feet, which will be used for making cores; a brick addition to the annealing room, 180 x 200 feet, which, with the present room, gives them about 144,000 square feet to devote to this branch of the business, and a brick addition to the foundry, 135 x 150 feet, designed to add to their facilities for producing steel castings. The H. Wales Lines Company of Meriden have the contracts for the buildings and expect to complete them in the early spring.

The company expect that with the new buildings in operation they will be able to keep pace with the demand for their regular line of fittings and custom malleable steel and semisteel castings.

The matter of charging a small rate for hauling blast furnace slag, which was decided upon by the railroads in the Pittsburgh and Valley districts some time ago, and

which was to go into effect on October 1, has been postponed indefinitely. The charge was to have been 15 cents per ton, which is said to be about the actual cost of handling. In view of the fact that the railroad companies are still using a great deal of slag for filling, the point was raised by the blast furnace operators that there should be no charge for hauling it, and their request has been granted.

Notes from Great Britain.

The Bonus System.

LONDON, September 20, 1902.—I have more than once referred to the various proposals in the engineering trades for the establishment of a premium bonus. There have been many conferences, formal and informal, between employers and employed, but many difficulties have stood in the way. I am glad to report now that a provisional agreement has been reached between both sides, and on a most friendly basis, and the results cannot fail to prove interesting. A conference was held between representatives of the Engineering Employers' Federation and the Amalgamated Society of Engineers at Carlisle on August 19 and 20. At this conference was discussed the working of the bonus system at the works of Sir W. G. Armstrong, Whitworth & Co., Limited; the Central Marine Engine Works, West Hartlepool; Richardson, Westgarth & Co., Limited, Hartlepool, and Browett, Lindley & Co., Limited, Manchester. The discussion on the bonus systems of these companies turned out to be more complicated than was expected, and it was finally agreed that the employers' representatives should convey the terms of the following memorandum to the members of the Federation, and that the representatives of the Amalgamated Society of Engineers should, on the other hand, remove all restrictions to the working of a bonus system in federated workshops. This memorandum of agreement is short. It reads:

The employers' representatives have not the power to settle the conditions which should be observed in connection with the working of a bonus system without having previously obtained authority from the Federation in proper form. They are, however, prepared to advise all employers who wish to establish such a system in the meantime to adopt the following suggestions:

1. The time rate of wages for each job should in all cases be paid.
2. Overtime and night shift to be paid on the same conditions as already prevail in each workshop.
3. A time limit, after it has been established, should only be changed if the method or means of manufacture are changed.
4. No firm should establish the bonus system without intending to adhere to it.

The general secretary of the engineers has issued a circular to the members explaining the inner meaning of this memorandum of agreement. As the matter is of considerable importance, I think it perhaps better to quote it *in extenso* for the guidance of engineering firms in America who may be thinking of coming to a similar agreement with their own employees. The letter is as follows:

Please find herewith copy of provisional agreement drawn up as shown at Carlisle Conference. The premium bonus system of working has agitated a good many districts for some time, and fears have been expressed that its inauguration might lead to the evils with which we have been made familiar in piece work districts. It will be observed, however, from the terms of the inclosed document, that under the premium plan as agreed to provisionally by ourselves and the Employers' Federation these evils have been guarded against. It should also be said that the matter will be again discussed later on, when a complete and comprehensive document will be drawn up, which will settle other points here left open and deal with difficulties as disclosed in the practical working of the provisional agreement. Meantime:

1. The time rate of wages is in all cases guaranteed, and guaranteed for each job, so that, no matter how short a time may be occupied in any one operation for which a time basis has been set, the day rate of wages will be paid, at least while engaged on that job, thereby preventing a bonus on one job being lost through failure to make a bonus on another within any one week.
2. The existing practice of additional pay for overtime and night shifts will be continued, and paid for apart altogether from time limits as under the premium plan; that is to say, if overtime is worked it will be paid for through the office as a thing entirely apart.

The third clause provides for fixity of prices or time basis, once such has been established, so providing against that ever-recurring cause of trouble—namely, cutting of prices. In regard to this, however, it should be said that there may be some read-

justment necessary in the process of "establishing" the basis, as in starting a new system of working errors may be made, and it may therefore be found necessary to either shorten or lengthen the time first tried.

The fourth clause is intended to provide against mere experimentation for the purpose of gauging capacity and then reverting to day work.

Council advise that a fair and honest trial be given to the bonus system, as under the terms set out in the inclosed document, and, of course, we should have a right of raising any question arising from the introduction or continuance of the system if it was found that any firm were introducing it and not adhering to the terms therein set forth. This advice which is now tendered to your committee should be passed on to the members in the area over which you have jurisdiction. Perhaps it would be as well if copies of this document and letter be sent on by us to each branch in your district. That may be done in a few days. Meantime, Council desire you to convene a meeting at as early a date as possible and submit the full matter to the members of such committee.

Japanese Plates and Rails.

A few weeks ago I described in some detail the present position of the Japanese Government iron and steel works. Later information is to the effect that, in consequence of discoveries of considerable magnitude of iron ore deposits in the island of Formosa, the Japanese Government proposes to set aside a sum equal to \$500,000 for the establishment there of works to turn out plates and rails. A special Government commissioner is now reporting upon the cost and prospects of this project, to which great importance is attached.

An Approaching Contract.

Tenders will shortly be invited by the Russian Government for the supply of a large number of locomotives and a large quantity of rolling stock for new sections of the Siberian Railway and other lines in Central Asia, which are now nearing completion. Provision will be made for these purchases in the budget allowance for the Ministry of Ways and Communications during the next financial year.

Rumors as to a Combine.

Hardly a week passes now without some rumor finding its way into the press of extensive combination among iron and steel manufacturers of this country. The very latest is to the effect that Arthur Keen of the firm of Guest, Keen & Co. has put forward a scheme for a combine which would include the largest firms in Great Britain. The firms mentioned are the Barrow Hematite Steel Company, Limited; Bolckow, Vaughan & Co., Limited; Guest, Keen & Nettlefolds, Limited; Crawshaw Brothers; Moss Bay Hematite Iron & Steel Company, Limited; Charles Cammell & Co., Limited; Northeastern Steel Company, Limited, and the Rhymney Iron Company, Limited, whose combined capital will represent over \$60,000,000. More or less emphatic denials have come from all these firms as to the truth of the rumor, which has nevertheless gained a considerable degree of credence. I imagine the basis of this rumor arises from the resuscitation of the Steel Rail Manufacturers' Association.

Railway Rolling Stock Combine.

The Patent Shaft & Axletree Company of Wednesbury are now provisionally amalgamated with the Amalgamated Wagon Company, Limited. All that is required is the confirmation of the shareholders. The nominal capital of the Patent Shaft Company is £437,500 ordinary stock and £227,500 preferred. Of this amount there has been paid up £118,264 ordinary, and the whole of the preference shares are fully paid, the total subscribed capital therefore being £348,594 and £29,800 debenture loan. From the last balance sheet I observe that the works and plants were valued at £254,515; loose plant, tools and stock, £112,823; debtors, £75,497; cash, £52,290, and money invested, £50,000. The profits for last year were £30,318, as compared with £51,701 for the year ending May, 1900. The stock of this company is very good market value, both preference and ordinary shares being at a premium. I have already given particulars of the Amalgamated Wagon Company. The market price of their shares now stands at £1 16s.

A Big Order.

A big order has been placed by the Central South African Railways in England which calls for 104 coaches, 38 engines and 250 steel coal trucks of 80,000

pounds capacity. A few more orders like these should make the rolling stock companies quite happy.

Dividends and the State of Trade.

Palmer's Shipbuilding & Iron Company have this year £97,273 available for distribution. They pay a dividend at the rate of 5 per cent. per annum, which is a serious drop, as they have paid 8 per cent. for the last two successive years. The Pearson & Knowles Coal & Iron Company report a profit of £62,864, plus a balance brought forward last year of £10,133, leaving a total for distribution of £72,998. An interim dividend at the rate of 6 per cent. per annum on both preference and ordinary shares was paid in March last for the half year, and the directors now recommend a similar dividend, making a total distribution of £50,709 for the year. With the object of safeguarding and developing the company's trade in wire rods, which constitutes one of the most important branches of the business, the directors have invested a part of the reserve fund in the acquisition of shares, giving a preponderating interest in the works of their largest customer, with whom they have been in close alliance for many years. The directors further report that the course of business during the year has been unsatisfactory, and both coal and iron have suffered from declining prices and curtailed profits, largely due to the severity of foreign competition and the dislocation of trade brought about by the war in South Africa. When I read reports like this I sometimes wonder how far we are being bluffed by market reports. It is certainly a fact that all through the year the market reports have been on the whole optimistic, while the profits of the large concerns show a very serious drop all round. This is shown very clearly in an analysis by the *Economist* of the leading iron and steel companies' reports for the two past years. I subjoin herewith the table compiled by the *Economist* showing the net profits and dividends. I believe I have in each case mentioned these dividends as they were announced, but the full effect of the general decrease will only be appreciated by giving the table in full:

Company.	1901-02.			1900-01.		
	Net profit.	Per cent.	Amount.	Net profit.	Per cent.	Amount.
Bolckow, Vaughan & Co.....	£183,462	5	£160,919	*£618,297	8½	£392,425
Guest, Keen & Nettlefolds.....	393,597	10	225,322	355,515	10	94,671
Henry Briggs, Son & Co.....	61,774	20	61,705	118,194	20	93,974
Howard & Bullough.....	94,546	8	75,000	.....	30	92,557
Kayser, Ellison & Co.....	19,558	10	13,500	146,250	11	97,500
Main Colliery.....	56,765	20	30,000	18,046	10	13,500
Niddrie & Benhar Coal.....	18,511	12	12,900	101,469	40	78,246
Normanby Iron Works.....	627	nil.	nil.	30,023	20	21,500
Pease & Partners.....	84,568	8	80,000	6,846	6	5,607
Pearson & Knowles Coal & Iron.....	63,756	6	36,600	310,341	17½	175,000
Staveley Coal & Iron.....	127,249	10	78,200	142,425	12½	90,437
Steel Company of Scotland.....	36,898	2½	11,151	320,918	18½	279,760
Tredegar Iron & Coal.....	84,692	5	41,217	22,577	1½	7,434
Walter Scott.....	62,332	12½	52,375	124,267	7½	61,825
Workington Iron.....	9,675	7½	8,438	145,222	8½	33,025
Weardale Steel, Coal & Coke.....	107,060	16	43,500	20,976	10	8,076
	£1,405,076	..	£930,827	195,748	6	43,500
				£2,677,114	..	£1,589,037

* For 18 months.

The net profits of these concerns for the year 1901-1902 show a reduction of nearly 50 per cent. on the previous year. It is true, to say further, that the reduction of dividends noted above is not proportionately so great as the diminution in net earnings.

The Markets.

There is little new to report in regard to the markets. Business at Glasgow continues active, but there has been a weakening in prices. Glasgow warrants are selling at 57 shillings 7½ pence, a fall of 7½ pence during the last few days; Cleveland, 53 shillings 8 pence, but Cumberland hematite has gone up 2 pence. Yesterday for the first time for a long period sellers of Middlesbrough hematite quoted 60 shillings. This general weakening of prices indicates, I think, that while former orders are being filled as speedily as possible new Ameri-

can orders are not coming in. Some small lines have been received and I hear of a sale of 10,000 tons ordinary mixed numbers East Coast hematite for shipment this autumn. Midland consumers are holding off the market as much as possible, in the expectation of a fall in prices. In any event, nothing much will now be done until the turn of quarter day. On the whole the market is stagnant.

S. G. H.

MANUFACTURING.

Iron and Steel.

The new 10-inch continuous mill recently added to the Bessemer plant of the Republic Iron & Steel Company, at Youngstown, Ohio, was started up last week. It is said the mill is working very successfully.

Stack No. 3 of the National Steel Company, at Youngstown, Ohio, which has been idle for two months, being refitted and repaired, was started up last week. All three stacks of this company at Youngstown are now in operation. As yet no appropriation has been made by the United States Steel Corporation for the building of another blast furnace at Youngstown, Ohio, but it is expected. The output of the fourth furnace is needed to supply the Ohio Bessemer Works with metal.

The Brady's Bend Iron Company, a new organization that propose to build a blast furnace at Brady's Bend, near Kittanning, Pa., will develop a coal property which they own, and will also build a large number of coke ovens to supply their new stack with coke.

The Philadelphia Steel & Iron Company, Frankford, Pa., have purchased more ground for the enlargement of their plant. They advise us that they propose in the very near future to erect an open hearth steel addition to their Atlas Works.

Searles Furnace, the new stack of the La Follette Coal, Iron & Railway Company, at La Follette, Tenn., was blown in September 24, making a perfect start with all prospects satisfactory. The stack is 20 x 95 feet and has an annual capacity of 125,000 tons of coke pig iron. John E. Searles is president of the company and H. M. La Follette is vice-president and manager.

Work has been started in the new plant of the Columbia Steel Company at Elyria, Ohio. The four main buildings are to be completed by January 1. The main mill will be 84 x 406 feet, the engine and boiler house 81 x 132 feet, the shipping house

63 x 80 feet, and the pickling room 52 x 72 feet. A switch will be laid connecting with the Baltimore & Ohio and Lake Shore & Michigan Southern railways.

The Anniston Rolling Mills of Anniston, Ala., will enlarge their mill by the installation of an 8-inch guide mill and an additional large heating furnace with waste heat boilers. The product will be increased 100 per cent. and the mill will run double turn. W. L. Sims, formerly secretary and treasurer of Sloss-Sheffield Iron & Steel Company and recently general manager and treasurer of Empire Steel & Iron Company, has been elected president and treasurer, with headquarters in the new Woodward Building, Birmingham, Ala.

The McKeesport Tin Plate Company, who are building a tin plate works at Port Vue, McKeesport, Pa., expect to have the plant in operation about the first of the year.

The new blast furnace which has been under erection for some months by the National Tube Company, at Benwood, W. Va., is nearing completion and the stack is expected to be ready for blast about January 1.

The Sheet Steel Company of Pittsburgh, who recently took over the sheet mill of the Tuscora Steel Company, at Newcomertown, Ohio, are now operating that plant nonunion.

The Keystone Rolling Mill Company, Limited, of Pittsburgh, chartered as a limited partnership in 1881, have been legally dissolved. Their plant is now operated under lease by the Fort Pitt Iron & Steel Company of Pittsburgh, in the manufacture of muck bar and skelp.

The Youngstown Iron Sheet & Tube Company have started up their bellweld tube mill at Youngstown, Ohio. This mill has a capacity of 75 to 100 tons a day.

A report has again been current that the United States Steel Corporation would absorb the Sharon Steel Company, at Sharon, Pa., on a basis of \$200 a share for the capital stock of that concern. The report, however, is untrue and has been officially denied.

It is said that a very large sheet mill is to be built at Wheatland, Pa., and that work will soon be started.

General Machinery.

W. F. Mosser & Son, founders and machinists, Allentown, Pa., are building small additions to the machine shop, pattern shop and foundry. No new equipment will be required, except a traveling crane, which they are negotiating for. The principal part of their business is cement mill machinery, and they report their shops overcrowded with work.

A. L. Henderer's Sons, Wilmington, Del., are building an addition to their shop, also new boiler and engine rooms. A Wetherill Corliss engine and Coatesville boiler will be installed, both of which have been secured. No other new equipment will be required at present.

The Waterbury Machine Company, Waterbury, Conn., will build a new erecting shop. All the new machinery required has been provided for.

The plant of the Hardy Machine Company, Biddeford, Maine, was sold at auction on September 19, the proceeds from the sale amounting to \$20,400. Representatives of large houses of many of the prominent Eastern cities were the purchasers, no considerable quantity of machinery being taken by any one concern.

The Waterloo & Cedar Falls Rapid Transit Company, Waterloo, Iowa, are building car shops at a cost of about \$10,000. All the equipment has been purchased.

The C. C. Henderson Machine Company, Greenville, Ala., have purchased all their large tools, except the hydraulic wheel press. These were bought from the American Tool Works Company of Cincinnati through the Milner & Kettig Company of Birmingham, and consist of an engine lathe, 36 inches by 24 feet; lathe, 16 inches by 10 feet; planer, 30 x 30 inches by 8 feet; 16-inch shaper, 25-inch back geared standard drill press, with the usual amount of small tools for a shop, 40 x 80 feet. A 15 horse-power boiler and engine will supply the power. They expect to have the shop in operation the latter part of next month.

A quantity of new machinery and tools will be required by the Elkhart Power & Paper Company, Elkhart, Ind., recently incorporated with a capital stock of \$450,000. Address all correspondence to Walter Brown, manager.

Deeds have been filed conveying the Corliss Steam Engine Works of Providence, R. I., from the International Power Company to the American Machine & Ordnance Company of Bridgeport, Conn., who were incorporated last spring with a capital stock of \$10,000,000. The company are a consolidation of the American Ordnance Company of Bridgeport, Conn., and several other gun and projectile concerns. Joseph H. Hoadley, President of the International Power Company, also heads the Ordnance Company.

Titusville Forge Company, Titusville, Pa., have recently installed one 32 inch and two 36 inch lathes and one 15-inch slotter as an addition to their machine shop department.

The Standard Underground Cable Company of Pittsburgh will make some large additions to their plant in that city. A three-story brick and steel machine shop, 40 x 100 feet, is to be erected, while a large amount of new equipment will be installed in the present plant. This concern recently increased their capital stock and a large part of the increase will be used in making enlargements at their plant at Perth Amboy, N. J.

The Keystone Smooth Forging Company have been organized in Pittsburgh, with a capital of \$50,000, and will manufacture pinions, shafting and heavy forgings. The company have secured the foundry building formerly occupied by the Phoenix Foundry Company, Twenty-eighth street, in Pittsburgh, and are installing modern equipment. The officials of the Keystone Smooth Forging Company are A. McMillan, president; W. E. McMillan, secretary and treasurer, and C. E. Long, general manager.

The West Virginia Boiler & Machine Works, Mannington, W. Va., are in the market for machinery for their new boiler shop. See *Boilers, Engines, &c.*

The General Electric Company contemplate the erection of a new forge shop, 120 feet square, at their works in Lynn, Mass.

The Excelsior Tool & Machine Works, 212-214 Spruce street, St. Louis, Mo., established by T. F. Philippi in 1895, making a

specialty of the manufacture of range and furnace makers' tools and machinery, have incorporated with a capital stock of \$75,000 and have purchased a 5-acre site in East St. Louis, upon which they are erecting a new plant, comprising a foundry, machine shop, engine house and storeroom. The different departments will be equipped with the latest improved machinery, of which we are informed the company will shortly be in the market for the following: A complete foundry outfit, consisting of two cranes, 6 to 8 foot boring mill, 24-inch lathe, 24-inch planer, small slotter, heating device, &c. The new plant will have a much larger capacity than the present one, which is entirely too small to take care of their increasing business, and when completed will represent an outlay of about \$50,000. T. F. Philippi will be president.

The National Machinery Company of Tiffin, Ohio, have just shipped two more cars of wire nail machines to the Pittsburgh Steel Company, Monessen, Pa., and three cars to the Colorado Fuel & Iron Company, Bessemer, Col. Orders for bolt and nut machinery are coming in from all quarters, and the export business, especially with Asia, France and Australia, is exceptionally heavy.

The Richards Iron Works, Birmingham, Ala., are removing from 1600 to 2618 First avenue, where they will have increased facilities for taking care of their trade.

The Cleveland Automatic Machine Company of Cleveland have been incorporated under the laws of New Jersey with \$1,500,000 capital stock by George H. Kelly, G. G. Whitcomb, J. C. Russell and A. L. Garford of Cleveland. The company succeed the well-known Cleveland Machine Screw Company. Originally this company were organized to manufacture machine screws. Later they dropped this line to go into the manufacture of the well-known Cleveland screw machines. Lately they have taken up the manufacture of several other types of automatic machine tools and a more comprehensive title was thought desirable. At present a large part of the stock of this company is held in France, and it is intimated that steps are being taken whereby it will be bought back by Cleveland people.

Directors of the United Pump & Supply Company of Toledo have awarded a contract for the erection of their new plant to Julius Comte, and work on same is to start at once. The main building will be 80 x 200 feet, with a cupola 10 feet high and 26 feet wide the full length of the building. The structure will be of range stone and brick and will occupy 4 acres of land purchased by the company on Industrial Heights, affording direct connections with the Terminal Belt and Lake Shore & Michigan Southern roads. The company will continue the manufacture of the double acting force and lift pumps heretofore manufactured by the Standard Mfg. Company, and will also produce a full line of other pumps, wind mills, galvanized steel tanks, pneumatic spray pumps, coating machines, plows, cultivators and other implements. Transfer houses will be established in Philadelphia, Kansas City and St. Paul. Officers and directors of the new company are: Roscoe Bean, president; D. J. Nyeswander, vice-president; G. E. Pomeroy, treasurer; H. C. Chamberlain, secretary; J. Stollberg, N. C. Palmer and Dr. C. H. Mills.

The Baltimore & Ohio Railway is planning to locate large repair shops near Painesville, Ohio. The plans provide for the erection of shops for the repairing of both wooden and pressed steel hopper bottom cars, as well as a machine shop and round house.

Boilers, Engines, &c.

J. Harrison Orwig is at the head of a movement to establish a large boiler works at Niles, Ohio. A proposition has been made to the Board of Trade of Niles that will likely be accepted.

The General Electric Company have furnished the Pittsburgh Reduction Company, Niagara Falls, N. Y., a 1000-kw. transformer of remarkable range of voltage. The frequency is 25 cycles, the primary voltage is 2200, and the secondary 30-75, while the secondary current is of 33,500 amperes.

The Grand Canyon Electric Power Company, Flagstaff, Ariz., are having surveys made for their proposed new power plant on Bright Angle Creek, a branch of the Colorado River. The officers are Julius Aubineau, president; A. Barman, vice-president, and D. Babbitt, secretary and treasurer.

The Marine Engine & Machine Company, 80 Broadway, New York, have increased their capital stock and have purchased the real estate and buildings thereon at Harrison, N. J., on which their plant is located. They now have no indebtedness of any kind. E. C. Benedict is president, F. S. Hastings vice-president, J. B. M. Showell secretary and A. L. Beves treasurer.

The Georgia Iron & Coal Company, Atlanta, Ga., advise us that they will shortly be in the market for an additional blowing engine and one or two additional pumps for their furnace at Rising Fawn. They recently purchased a battery of Cahall boilers, 1500 horse-power, from the Aultman & Taylor Machinery Company, Mansfield, Ohio.

The Princess Anne & Deal's Island Light, Power & Railroad Company, Princess Anne, Md., will construct an electric road and furnish light, heat and power. It is probable that a good sized power plant will be erected. Hampden P. Dashiell is president.

John W. Cawley, treasurer of the Arlington Gas Light Com-

pany, Stoneham, Mass., will build a new electric plant of about 200 horse-power at Nantucket, Mass., of which place he has entire control of the lighting system, having purchased both the Nantucket Gas Light Company and the Nantucket Electric Company.

The Paulsboro Water Company, Paulsboro, N. J., will receive bids until October 11 for triplex pumping machinery, gasoline engine and other materials for water works.

The Water Commissioners, Brockton, Mass., will receive bids until November 8 for furnishing and erecting a vertical triple expansion condensing crank and fly wheel pumping engine of 6,000,000 gallons daily capacity. Blank proposals and specifications will be furnished on application to the commissioners.

Bids are advertised for by the municipality of Moline, Ill., for furnishing a high duty pumping engine of about 6,000,000 gallons daily capacity, mechanical filter plant, low lift pumping plant and a clear water reservoir. Proposals will be opened October 29. Forms can be obtained and plans can be seen at the office of the city clerk of Moline or at the office of Daniel W. Mead, consulting engineer, 605 First National Bank Building, Chicago. P. H. Wessel is mayor and Charles G. Carlson city clerk.

Henry C. Mooers of Toledo, formerly of the H. Mooers Company, is organizing a stock company for the purpose of manufacturing an automatic steam trap of which he is the inventor. The device is covered by patents and is used in several large power plants in Toledo. J. W. Flowers, secretary of the Toledo Chamber of Commerce, is interested in the project.

The town of Defiance, Ohio, are planning to erect a water works pumping station in the Maumee River near that city.

The Morningstar Mfg. Company of Napoleon, Ohio, have been incorporated with \$50,000 capital stock by R. W. Cahill, A. B. Blank, A. J. Saulter, Otto Galman, E. N. Warden, and D. D. Donovan, all of Napoleon. The company will manufacture traction engines and separators. A large factory will be erected and next spring a large foundry will be added. It will be equipped to produce castings of all kinds.

M. Janowitz, manager of the Lincoln Steam Boiler & Sheet Iron Company, Lincoln, Neb., recently visited Sioux City, Iowa, for the purpose of securing a building in which to establish a branch shop. The Lincoln Steam Boiler & Sheet Iron Company manufacture all kinds of boilers, stand pipes, tanks, heavy sheet iron work and smoke stacks.

The West Virginia Boiler & Machine Works, manufacturers of boiler and heavy plate work, at Mannington, W. Va., whose plant was recently destroyed by fire, advise us that they will rebuild on a larger scale and are in the market for a structural iron building 50 x 150 feet, and also machinery for their boiler shop. It is the intention to have the capacity of the new works double that of the old plant. The officers of the West Virginia Boiler & Machine Works are J. E. Carnahan, Canton, Ohio, president; W. M. Blecker, also of Canton, vice-president, and U. H. Defenderfer of Mannington, W. Va., secretary and treasurer.

The Miller Gas Engine Company of Springfield, Ohio, are completing their new plant, work on which was started shortly after the destruction by fire of the old Whitely plant in which they were formerly located. The plant is large and well equipped, all machinery being driven by electricity.

The stack on the new power house of the Chillicothe Railway Light & Power Company at Chillicothe, Ohio, collapsed a few days ago, entailing a loss of about \$10,000. The plant was just being completed.

Foundries.

The Detroit Steel Casting Company, Detroit, Mich., have the addition to their plant, 75 x 151 feet, completed and ready for occupancy.

The Excelsior Tool & Machine Works, 212-214 Spruce street, St. Louis, Mo., who are building a new plant at East St. Louis, advise us that they will shortly be in the market for a complete foundry outfit, consisting of two cranes, 6 to 8 foot boring mill, 24-inch lathe, 24-inch planer, small slotter, heating device, &c. See *General Machinery*.

The Standard Foundry & Mfg. Company of Cleveland have purchased the old Sad Iron works at Chagrin Falls, Ohio. They propose to erect an addition to this building to be used as a finishing department and will also erect a foundry, 136 x 400 feet, for their register and specialty departments. Their plant at Cleveland will be continued as heretofore.

Bridges and Buildings.

The National Iron & Wire Company of Cleveland, Ohio, have been awarded a contract for the iron and steel work of the new boiler house being constructed by the Pilsner Brewing Company in that city.

The Baltimore Bridge Company, Baltimore, Md., recently organized, have purchased the business of the Structural Iron & Steel Company of that city. The company have a large stock of material on hand and are in a position to make prompt deliveries. The plant has recently been remodeled and now has a capacity for 7000 tons per year. Plans are now under way for a girder shop, which will more than double the present output,

and will enable the company to handle the heaviest class of reamed and solid drilled work. Alfred M. Moss crop is manager.

The West Virginia Boiler & Machine Works, Mannington, W. Va., are in the market for a structural iron building, 50 x 150 feet. See *Boilers, Engines, &c.*

Fires.

The hub and wheel factory of E. Stinson & Co., the machine shop of John B. Adt and the Baltimore Hub Factory, owned by John Stinson, at Baltimore, Md., were destroyed by fire last week. The loss is about \$75,000.

The plant of the modern Rubber Company, at Trenton, N. J., was burned Sept. 24, entailing a loss of about \$20,000.

The plant of the American Lock Washer Company, Newark, N. J., was destroyed by fire Sept. 25. The loss will reach \$75,000. The building was three stories high and 100 feet square.

The foundry and new machine shop of the Havana Metal Wheel Company, Havana, Ill., were destroyed by fire Sept. 21, causing a loss of about \$15,000.

E. F. Parker's foundry and machine shop, at Imlay City, Mich., were recently destroyed by fire.

Hardware.

The Truss & Cable Fence Company, Youngstown, Ohio, have recently made large shipments of their fencing to Bombay, India, and also to Puerto Cortez, Honduras, Central America, as well as to other different ports. The company are doing quite a large export business in their fencing.

The Mathews Woven Wire Fence Company of Pittsburgh have been granted a charter with a nominal capital of \$1000.

Atlas Mfg. Company, New Haven, Conn., makers of Bradley steel shelf brackets, wire closet hooks and tinned spoons, moved into their present quarters a year ago, realizing at the time that the building was much larger than their requirements demanded. During the year they have been busy in their regular lines and also in building machinery for two new lines of goods which will be ready for the trade about January 1, so that all their surplus room of a year ago is now about fully utilized. The demand for their shelf brackets has increased steadily, and the company state that probably there has not been a time during the past 18 months when they could ship an order of any considerable size with absolute promptness and completeness, and their stock is still in a broken condition.

A contract has been awarded for building a new machine shop, 60 x 172 feet, two stories high, with basement 17 x 113 feet, by the Vermont Farm Machine Company, Bellows Falls, Vt. Work will be begun at once, and the building pushed to completion as rapidly as possible. The new shop will be located to the west of the present main building, and will add greatly to the manufacturing capacity. The new addition to the main building, 40 x 60 feet and three stories high, has just been completed. A storehouse four stories high, so arranged that freight cars can be backed into the building for loading, is a possibility of the near future. Last winter the company built and equipped a handsome new office building. The company are manufacturers of the Improved United States cream separators and Cooley creamers, engines, boilers, and a full line of creamery and dairy supplies.

Chattanooga Implement & Mfg. Company, East Chattanooga, Tenn., have just completed a large addition to their molding room, which was made necessary by their large line of new patterns of grates. They refer to the pea crop as very fine this season, making such a demand for their hullers as to throw them behind on orders, although the season is only just well open. Besides the above lines the company manufacture heating stoves, sad irons, tailor irons, charcoal irons, stand lasts, hay presses, &c.

The galvanizing and tinning plant of the Alaska Freezer Company of Winchendon, Mass., is completed and now ready to put in operation. The plant was built from plans furnished by W. T. Flanders, and with a special view to the particular requirements of the freezer business. It is equipped with the "W. T. Flanders" process for tinning gray iron. The plant is described as complete in every particular, in which special attention has been paid to economy in handling the work through the various operations.

Light Cycle Company, Pottstown, Pa., besides the Light cycles, have for the past three years been manufacturing automobile running gears for gasoline, steam or electric motive power, and wire and wooden wheels. They state that they are in a position efficiently to meet any requirements in this line.

Wrightsville Hardware Company, Wrightsville, Pa., are very full of work. In fact they have never been so busy as now, although their facilities have been doubled as compared with a year since. They have added two 25 horse-power engines to direct their two new positive blowers and elevator hoists, thus dispensing with the many disadvantages of long lines of belting. They have also more than doubled the size of their core department, and are now building a second fire proof vault for the protection of the large line of patterns on hand from their patrons for whom they are making hundreds of tons of lost machinery castings. They also contemplate erecting another brick factory

building, 52 x 140 feet, as they have ample facilities to take up this additional output, which when completed will make their consumption of iron about 50 tons per day. With these additions they feel quite sure they can give their greatly increased trade more prompt delivery than heretofore.

The Ludlow-Saylor Wire Company, St. Louis, Mo., have largely increased their manufacturing facilities during the past year, especially in their fly screen cloth department. They have also added a galvanizing department to their business and are now supplying large quantities of the galvanized grade of hardware wire cloth.

The Oakville Company, manufacturers of metal goods, wire and pins, have about completed a large four-story addition to their plant at Oakville, Conn.

Maine Mfg. Company, Nashua, N. H., are increasing their capacity to such an extent that they will be in a position to turn out for the season of 1903 25 per cent. more refrigerators than they were able to produce in 1902, which was the largest season in their history. Changes just completed comprise the addition of a new and powerful engine, and they have now under construction new buildings which will give them an additional floor space of something like 20,000 square feet. Their salesmen are already out, and they have booked many large orders for 1903 delivery.

The Philadelphia Lawn Mower Company, Philadelphia, Pa., have very much increased their capacity by occupying the entire plant formerly jointly used by themselves and Goodell & Waters, who have removed to their own factory at Nicetown. They have thus more than doubled their floor space for the manufacture of the genuine Philadelphia lawn mowers for hand and horse power, the former being made in 15 styles and the latter in five styles, suited to all classes of trade in this and foreign countries. This important change has been rendered necessary by the large expansion in their export trade and the constantly increasing domestic demand, and they hope to be in such a position that they will be able promptly to fill all orders for next season, no matter how large the demand. The company also call attention to the fact that they are in a position to furnish extra parts for any of their Philadelphia lawn mowers, which have been manufactured since 1863, and that the trade can at any time obtain repairs for any of their mowers regardless of the age of the implement.

Wirt & Knox Mfg. Company, Philadelphia, Pa., who have during the past ten years made several changes in location with a view to securing increased floor space to keep up with the enlarging demand for their Wirts' patent all-metal hose reels and pump racks, have finally secured the entire building, 22 and 24 North Fourth street, where they are now comfortably settled. Heretofore they have frequently annoyed their customers in the way of delayed shipments, but in their new quarters they have ample space for manufacturing and keeping in stock a full line of their goods ready for immediate shipment.

Miscellaneous.

Orders have been placed by the Pittsburgh & Buffalo Company for more new steel cars to meet the shortage in the railroad supply for shipping purposes. The last order was for 200 steel gondola cars, with a capacity of 80,000 pounds, and will give that company 630 cars of their own. Of this number 400 are of the wooden type. The same company will probably secure 500 additional wooden cars.

An electric railway and power station will be constructed by the Princess Anne & Deal's Island Light, Power & Railroad Company of Princess Anne, Md. Hampden P. Dashiell is president of the company.

Merchant & Co., Incorporated, of Philadelphia, manufacturers of babbitt and anti-friction metals, brass, copper and bronze sheets, rolls, tubes, wire, rods, &c., have installed a complete automatic sprinkler service in their works. The apparatus was furnished by the International Sprinkler Company of Philadelphia.

The American Cabinet Company, a consolidation of the American Cabinet Company of Canisteo and the Smith Table Works of Warren, Pa., have purchased 20 acres of land at Fairmount, north of the Buffalo city line, New York, and will erect four large buildings, all two stories high and of brick. The main factory building will be 100 x 200 feet, the finishing and packing room 50 x 150 feet, the boiler, engine room and pumping house 40 x 60 feet, and the dry kilns and gluing room 50 x 150 feet. The plant will cost upward of \$250,000 when completed. The site has 450 feet frontage on the New York Central Railroad.

The S. Severance Mfg. Company, Pittsburgh, Pa., manufacturers of spikes, rivets, bolts, &c., are erecting an addition to their plant which will more than double their present capacity. The new building will be used almost exclusively for making high grade boiler rivets by the automatic process. They recently incorporated their business with a capitalization of \$500,000.

The People's Gas & Electric Light Company, Xenia, Ohio, advise us that they purpose to rebuild their gas plant, and will be in the market for apparatus from benches to gasometer.

The Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa., are arranging to rebuild their galvanizing plant immediately.

It was destroyed by fire September 20. Little new machinery will be required.

Plans are in preparation for additions to the cloth mill of Jacob Miller, Sons & Co., Philadelphia, Pa., to include a two-story engine and boiler house and dye and finishing mill building, covering an area of 60 x 118 feet.

It is said that arrangements have been completed by which a syndicate of capitalists of Youngstown, Ohio, will erect a large plant at Struthers, Ohio, to build steel cars under the Summer's patents.

Lazard Kahn, of F. & L. Kahn, Bros. & Co., stove manufacturers of Hamilton, Ohio, has been appointed receiver of the J. C. Bartlett Company, stove and range manufacturers of Pittsburgh. Three creditors of the company asked that this action be taken and also filed a petition in bankruptcy against the concern. The creditors filing the petition, with the amounts of their claims, are: McClure & Co., \$2841.78; Stephenson Mfg. Company, \$131.75; Woodworth-Evans Company, \$45.

Townsend, Reed & Co., Incorporated, Indianapolis, Ind., have made the following purchases for the electric railway they are constructing from that city to Lafayette, and from Lebanon to Crawfordsville, in all 90 miles: Carnegie Steel Company, 10,000 tons of 70-pound rails; Jno. A. Roebling's Sons Company, Trenton, N. J., copper wire; Hamilton Corliss Engine Company, Hamilton, Ohio, engines; General Electric Company, Schenectady, N. Y., electrical machinery; Jewett Car Company, Newark, Ohio, 24 interurban cars; Peckham Truck Company, Kingston, N. Y., trucks, and Ohio Brass Company, Mansfield, Ohio, overhead supplies. The road will be finished in about a year.

The Double Truss Cornice Brake Company, Buffalo, N. Y., expect to have their new plant completed by November. It is a brick L-shaped building with a frontage of 70 feet and a total depth of 112 feet, and will be operated by steam power.

At a meeting of the New England Asbestos Mining & Milling Company, held at Fall River, Mass., Sept. 29, the stockholders voted to increase the capital from \$500,000 to \$1,500,000, to purchase three mines in Canada.

The new shipbuilding plant of the Columbia Iron Works of St. Clair, Mich., is nearly completed. The company already have a contract for two small cargo steamers, and it is expected that the keels of both boats will be laid within the next 30 days. Preliminary work has been started on one of the boats, but has not progressed far owing to the slow delivery of machinery. The company's new shipyard has a frontage of 1800 feet on the St. Clair River and embraces altogether 50 acres. The plant will be complete for building and repairing steel ships, with foundry and machine and boiler shops, and will turn out boats complete, including boilers and engines.

The Koenig & Luhrs Wagon Company of Chicago and Quincy, Ill., have decided to build a wagon factory in Kansas City. Property has already been leased for the purpose and the contract let for the erection of a two-story brick building, 48 x 120 feet, to cost \$10,300. The company hope to have the factory in operation by December 15. Otto Koenig, one of the firm, will manage the business of the Kansas City branch.

Capitalists of Charlotte, N. C., contemplate the building of a large wagon factory at Thomasville. It is expected that a company with a capital stock of \$100,000 will be formed. W. B. Ryder, formerly superintendent of the Charlotte division of the Southern Railway, is one of the leading spirits in the building of this factory.

The James Rees & Sons Company of Pittsburgh now have contracts which will keep their boat building equipment busy for nine months or more. They have a contract for a large boat for the Government, to be used as a snag and repair boat near Pittsburgh, and for another to ply on the Magdalena River, in the United States of Colombia. They also have contracts for a number of steel hulls for boats.

Negotiations are pending for the consolidation of several important companies manufacturing patent articles of railway equipment. Some progress has been made. The accounts of the various companies who it is proposed will enter the merger are being examined with a view to obtaining an equitable basis for consolidation. It is understood that President W. R. Leeds of the Rock Island Railway is deeply interested in the successful outcome of the enterprise. Six companies have been named as considering the proposition for consolidation. We are reliably informed that several of the companies named in the daily press as participating in the enterprise have not been approached and probably will not be. Neither is the amount of capital proposed correct. Naturally the promoters of the enterprise are unwilling to give details at this stage of progress.

W. G. A. Millar, formerly manager of the Ornamental Department of the American Bridge Company, has been appointed purchasing agent of that company, with offices at 259 South Fourth street, Philadelphia, Pa.

The Iron and Metal Trades.

While the anthracite coal miners' strike is directly or indirectly responsible for much of the shortage of Pig Iron in the East, it is evident that even if there had been no strike the furnaces of this country would have been unable to meet the demand. Foreign sources of supply would have been drawn upon.

Business in Pig Iron and Steel Billets for importation continues quite heavy. The demand for Pig Iron comprises Bessemer as well as all grades of Foundry Iron. A sale of several thousand tons of foreign Bessemer is reported to have been made at \$22, Boston. The importations of Foundry Pig Iron are considerably swelled by commission houses purchasing for importation on their own account for the purpose of supplying their customers with Pig Iron needed for quick delivery. The report is incorrect that large orders for foreign Bessemer have been canceled because it has been found unsuitable for American use. Trouble arose in one case simply because specifications were loosely drawn. The quantity of foreign Billets now under consideration is reported larger than for several months. Quite a number of round lots were sold during the past week and further negotiations are in progress. German manufacturers have booked such a large amount of Billet business from this side that they are advancing prices. The conditions governing the foreign trade in Steel Billets are very peculiar, as it sometimes happens that if a mill is well supplied with orders for standard Billets the quotation on standard sizes will be advanced above that for odd sizes.

An interesting development with regard to the duty on Billets is reported from Philadelphia. It is well known that German manufacturers make two sets of prices on Iron and Steel products, one for the domestic market and a lower price for export. The Philadelphia customs officials announce that they will not hereafter recognize the German export price, but will base the duty on the price which German consumers have to pay. This will have the effect of advancing the duty on Billets possibly \$2.24 per ton if the Philadelphia decision is sustained.

Importations of Structural Shapes are increasing. Beams are now laid down in New York at 1.80c., duty paid, and Angles at 1.90c. in not less than 500-ton lots.

The Coke situation continues exasperating to all classes of consumers. Furnaces in the West are again suffering from the nondelivery of sufficient Coke to keep them in operation and foundrymen in all sections of the country are finding their operations badly crippled for the lack of enough fuel to run their cupolas. This may prove serious if it continues, as it is cutting down the consumption of Pig Iron. It is, however, asserted that Pig Iron manufacturers would welcome a falling off in the pressure on them, provided that the movement does not go too far.

The overproduction in the Sheet trade has at length brought about a sharp cut in prices, which had been expected for some time. The reduction made by the leading Sheet interest during the week is \$5 per ton. This action had been anticipated a week or two before by heavy offerings by large Western jobbers at prices considerably under those at which they had previously been selling.

A revision of prices has also been made in the Wire trade, amounting to about \$2 per ton on Wire Nails and \$6 per ton on Barb Wire.

As we go to press a conference is being held in New York between T. J. Shaffer, president, and John Williams, secretary, of the Amalgamated Association of Iron, Steel and Tin Workers and the vice-presidents of districts and Conference Committee of the American Tin Plate Company. The conference is for the purpose of resuming negotiations in connection with the plan

for the manufacture of the "drawback plates" in this country. The probabilities are that it will not be concluded much before the close of this week.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one month and one year previous.

Oct. 1, Sept. 24, Sept. 3, Oct. 2,
1902. 1902. 1902. 1901.

PIG IRON:

Foundry Pig No. 2, Standard, Philadelphia	\$22.00	\$22.00	\$22.00	\$14.90
Foundry Pig No. 2, Southern, Cincinnati	\$22.25	\$22.25	\$21.25	13.75
Foundry Pig No. 2, Local, Chicago	\$23.00	\$23.00	\$23.00	15.00
Bessemer Pig, Pittsburgh	\$21.75	\$21.75	\$21.75	15.75
Gray Forge, Pittsburgh	\$20.75	\$20.75	\$20.50	13.75
Lake Superior Charcoal, Chicago	\$26.00	\$26.00	\$26.00	17.00

BILLETS, RAILS, ETC.:

Steel Billets, Pittsburgh	\$29.50	\$29.00	31.00	26.50
Steel Billets, Philadelphia	\$27.00	\$27.00	\$27.50	27.50
Steel Billets, Chicago	\$29.50	\$29.50	\$29.50	....
Wire Rods, Pittsburgh	35.50	35.50	36.00	35.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago	19.00	19.00	18.50	13.50
O. Steel Rails, Philadelphia	21.50	21.50	21.50	16.75
O. Iron Rails, Chicago	25.00	25.00	24.50	21.00
O. Iron Rails, Philadelphia	25.00	25.00	24.00	19.50
O. Car Wheels, Chicago	21.00	21.00	21.00	16.00
O. Car Wheels, Philadelphia	19.75	20.00	20.00	16.50
Heavy Steel Scrap, Chicago	18.50	18.50	18.00	13.00

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia	1.92	1.92	1.92	1.62½
Common Iron Bars, Chicago	1.85	1.85	1.80	1.65
Common Iron Bars, Pittsburgh	1.80	1.80	1.80	1.50
Steel Bars, Tidewater	2.00	2.00	2.00	1.65
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater	2.00	2.00	2.00	1.75
Tank Plates, Pittsburgh	1.75	1.75	1.75	1.60
Beams, Tidewater	Nom.	Nom.	2.10	1.75
Beams, Pittsburgh	Nom.	Nom.	2.00	1.60
Angles, Tidewater	Nom.	Nom.	2.00	1.75
Angles, Pittsburgh	Nom.	Nom.	2.10	1.60
Skelp, Grooved Iron, Pittsburgh	2.02½	2.02½	2.00	2.00
Skelp, Sheared Iron, Pittsburgh	2.10	2.10	....	2.05
Sheets, No. 27, Pittsburgh	2.75	2.85	2.90	3.25
Barb Wire, f.o.b. Pittsburgh	2.50	2.85	2.90	2.90
Wire Nails, f.o.b. Pittsburgh	1.90	2.00	2.05	2.30
Cut Nails, Mill	2.05	2.05	2.05	2.05

METALS:

Copper, New York	11.55	11.60	11.30	16.50
Spelter, St. Louis	5.30	5.25	5.25	3.95
Lead, New York	4.10	4.10	4.10	4.37½
Lead, St. Louis	3.97½	3.97½	3.97½	4.25
Tin, New York	25.30	25.80	27.05	24.25
Antimony, Hallett, New York	7.75	7.75	8.00	8.50
Nickel, New York	40.00	40.00	40.00	60.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York	4.19	4.19	4.19	4.19

* For 1903. † Foreign.

Chicago.

FISHER BUILDING, October 1, 1902.—(By Telegraph.)

Less activity and less buoyancy have been apparent in the market for Iron and Steel during the week under review. At the same time there have been no radical changes in temper or prices. The weakness which has been apparent in such lines as Sheets, Pipe, Nails and Wire has been more in evidence, at least it has made a greater impression on the general situation. In Pig Iron there have been one or two transactions involving a larger tonnage, but the majority of the business has been confined to carload or 100-ton lots. Foreign Iron has been less prominent, although there have been some sales which indicate considerable irregularity in prices resulting from analysis, buyer and time of delivery. Resales of spot Iron continue to be made at considerable premiums, but this practice is less general and prices narrower in range. The closing down of several Bar Iron mills may improve the market. The larger available supply of Nails and Wire and the disposition toward lower prices have been reflected in the demand for Billets, there being less disposition to purchase foreign material, but the higher freight rates from abroad are doubtless in large measure responsible for this condition. It is notable that Old Material is well sustained, notwithstanding the least confident feeling experienced by some dealers. It is notable that the demand for Rails, both for present and for next year's delivery, for Light and Heavy Sections, for domestic and foreign, continues active, indicating that a number of railroads are still in need of material for this year's construction and have not covered their wants for next year's necessities.

Pig Iron.—The influence of foreign Iron has been less apparent during the week, but the conditions previously noted have changed but little and there is still much irregularity in prices, especially for prompt delivery and contracts covering the current year. As to next year there is more uniformity in prices, but less activity in actual transactions. Buyers seem to be less urgent in their demands to cover immediate needs, and are content to pursue a conservative policy regarding contracts for next year's requirements. Furnaces in this section which have banked because of insufficient fuel have not yet resumed, finding no assurance of a steady supply of Coke, but local dealers have succeeded in securing a more ample supply to meet the needs of the foundrymen, being able to draw shipments from Colorado. Among the sales of Iron during the week have been 3000 tons of Southern No. 2 Foundry on the basis of \$20, Birmingham, and Valley Iron on the basis of \$22 at the furnace for delivery the remainder of the current year. Five thousand tons of No. 2 Foundry have also been sold on the basis of \$20, Birmingham, for delivery during the first half of 1903 and 1000 tons of No. 2 Foundry at \$20.50, Birmingham, for the second quarter of 1903. Sales of Ohio and Southern Silvery have been made in lots of single cars to 100 tons on the basis of \$31.60 for 7 per cent. and \$32.90 for 8 per cent. Silicon, delivered Chicago. Single cars of No. 1 Southern Coke Foundry have been sold at \$27.65 and No. 2 at \$27.15 for immediate shipment. No. 1 local Iron has been sold at \$27 and No. 2 at \$26 to \$26.50 in single car lots spot. There are also reports of a sale of 5000 tons of foreign Iron, grade not given, at \$22, Chicago, but resales of both foreign and domestic brands have been made on premiums ranging from \$2 to \$3 per ton over the prices quoted. Pipe works are reported to have made further purchases through their London representatives, but as these sales have not passed through the hands of local dealers no specific prices can be given. Two hundred tons of No. 2, foundry inspection, sold at \$26, delivered Chicago, the latter part of October. The following are the prices current for delivery during the first half of 1903:

Lake Superior Charcoal.....	\$26.00 to \$27.00
Local Coke Foundry, No. 1.....	23.50 to 24.00
Local Coke Foundry, No. 2.....	23.00 to 23.50
Local Coke Foundry, No. 3.....	22.50 to 23.00
Local Scotch, No. 1.....	24.00 to 24.50
Ohio Strong Softeners, No. 1.....	25.50 to 26.50
Southern Silvery, according to Silicon.....	24.10 to 24.50
Southern Coke, No. 1.....	24.15 to 24.65
Southern Coke, No. 2.....	23.65 to 24.15
Southern Coke, No. 3.....	23.15 to 23.65
Southern Coke, No. 1 Soft.....	24.15 to 24.65
Southern Coke, No. 2 Soft.....	23.65 to 24.15
Foundry Forge.....	22.15 to 22.65
Southern Gray Forge.....	21.65 to 22.15
Southern Mottled.....	21.65 to 22.15
Southern Charcoal Softeners, according to Silicon.....	27.15 to 27.65
Alabama and Georgia Car Wheel.....	27.00 to 27.50
Malleable Bessemer.....	24.00 to 25.00
Standard Bessemer.....	25.00 to 26.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon.....	27.60 to 28.60

Bars.—The market for Bar Iron has continued very quiet, there being few large orders for new business and light specifying on old contracts. The only sale of moment has been about 1400 tons at 1.85c., delivery extending into January, 1903; smaller lots are selling at 1.95c., Chicago. Soft Steel Bars have been in only moderate demand, but the market has continued steady without special feature. The following are the prices current: Soft Steel Bars, 1.75c. to 1.90c.; Hoops, 2.10c. to 2.25c.; Angles, 1.85c. to 1.95c., base, mill shipments. Even the demand for small quantities of Bars and Angles from store has been less active, Bar Iron selling at 2.25c., Soft Steel Bars at 2c. to 2.25c., Angles at 2.50c. and Hoops at 2.50c., from store.

Structural Material.—There has been a less urgent demand for Structural Material of all kinds for next year's delivery, but there have been moderate contracts placed by bridge works and contractors. There is considerable activity in preparing for large office structures in Chicago, one of which, if carried out according to plans projected, will require about 8000 tons of Structural Material. Mills are refusing daily orders for Angles, Beams and Channels which are desired for the current year delivery, but there has been more demand for foreign Steel, with sales of 300 tons of Beams and Angles on the basis of 2.15c., Chicago. The prices current for domestic Steel, mill shipment, are as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c. Dealers having local stocks find no difficulty in obtaining a premium of \$2 to \$5 per ton over prices quoted: Beams and Channels are selling at 2.50c. to 2.50c., Angles at 2.50c. to 3.50c. and Tees at 2.55c. to 3.50c. at local yards.

Plates.—The demand has continued very active, with some considerable business for delivery during the first six months of next year. The market has continued extremely strong. The following are the prices current: Tank Steel, 4-inch and heavier, 1.75c. to 2.25c.; Flange, 1.85c. to 2.35c.; Marine, 1.95c. to 2.50c. The demand for small quantities

for immediate shipment from local stocks or from mill continues urgent, and the following prices are readily obtained: Tank Steel, 4-inch and heavier, 2.30c. to 2.50c.; Tank Steel, No. 8, 2.45c. to 2.55c.; Flange, 2.50c. to 2.75c., all f.o.b. warehouse, Chicago.

Sheets.—No improvement is noted in the market for Light Sheets. The demand has continued active, but with free offerings and keen competition very low prices continue to be made, and the market is unsettled and feverish. The jobbing demand continues active, but prices remain unsettled. Prices are as follows: No. 27 Black Sheets sell at 3.05c. to 3.15c., mill shipment; small lots from store are offered at 3.25c. to 3.35c., Chicago. Mill shipments of Galvanized Sheets are held at 4.05c. to 4.25c., net, while small lots from store are selling at 4.30c. to 4.40c. for No. 27.

Cast Pipe.—There has been but little animation during the week, municipal contracts being few and far between, but there has been fair demand from railroads, with sales of about 1000 tons. The demand for small amounts from gas and water companies has been less active, but the market has not changed essentially. Manufacturers continue to sell small lots at the following prices: 4-inch, \$35.75 to \$36; 6-inch, \$33.75 to \$34; 8-inch and upward, \$33. Gas Pipe, \$1 per ton higher than Water, f.o.b. Chicago.

Billets.—There has been an improved demand for domestic Billets, with sales of 2000 tons of Open Hearth Basic, special analysis, at \$36 for delivery during the current year, a small portion of which will lap over into January. Smaller lots of similar Billets have been sold at \$38 to \$40, but the average run of Bessemer Billets are not quotable over \$32 to \$35 in 1000-ton lots. There is a rumor that 10,000 to 12,000 tons of foreign Billets have been closed on the basis of \$29.50 to \$30, Chicago, but this is not confirmed. There is still considerable inquiry, with various lots under negotiation, but an advance in freight rates ranging from 50c. to \$1 per ton has checked the buying movement.

Merchant Pipe.—The market has continued unsettled, with prices irregular, liberal discounts being offered for mill shipments by independent mills. The jobbing demand has been fair. The following are the prices current, random lengths, Chicago: Black, 1/4 to 1/2 inch, 56 1/2 off; 3/4 to 12 inches, 63 1/2 off; Galvanized, 1/4 to 1/2 inch, 43 1/2 off; 3/4 to 12 inches, 50 1/2 off.

Boiler Tubes.—There has been a fair demand, and the market has remained steady. Prices are as follows for mill shipment:

	Steel.	Iron.
1 to 1 1/2 inches.....	42 1/2	39
1 1/2 to 2 1/2 inches.....	55 1/2	38
2 1/2 to 5 inches.....	61	48
6 inches and larger.....	55 1/2	38

The moderate order demand experienced from store has been readily met at the following prices:

	35	35
1 to 1 1/2 inches.....	47 1/2	32 1/2
1 1/2 to 2 1/2 inches.....	55	42 1/2
2 1/2 to 5 inches.....	47 1/2	..
6 inches and larger.....	47 1/2	..

Merchant Steel.—There has been a fair degree of activity, with several contracts of moment for Tire, Spring Steel, Shafting, &c., a number of belated manufacturers covering contracts for next year. For mill shipment prices are as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 47 off in carload lots and 42 off in less than car lots. Ordinary grades of Crucible Tool Steel are quoted at 6 1/2c. to 7c. for mill shipment; specials, 12c. upward.

Rails and Track Supplies.—There is no cessation in inquiry for Rails for early delivery, and there is further evidence that a number of railroads have not yet covered their needs for 1903. The actual transactions closed, however, have not been large. There have been several orders from 1000 to 2500 tons, aggregating probably about 7500 tons, for next year's delivery. There is also under negotiation a lot of 20,000 tons for delivery during the last quarter of this year. Also one lot of 12,000 tons of foreign Sections for this year's delivery. There continues to be a good demand from electric railways. Light Rails have also been in fair demand. Official prices remain at \$28 for Standard and \$27 for Second Quality, mill shipment. The lighter Sections range from \$32 to \$35 in carload lots, according to weight and time of delivery. Jobbing quantities command a premium of \$3 to \$5 per ton. Track Supplies have remained in fair demand, and the market has continued firm at full prices, the following being the basis of sales: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Old Material.—In addition to the purchases of 50,000 tons of foreign Iron referred to a week ago, it is reported that local mills between September 1 and 15 purchased domestic and foreign Scrap in various amounts, also aggregating 50,000 tons, but during the past week or ten days there has been less activity, although sales of 1000 to 2000

The Iron and Metal Trades.

While the anthracite coal miners' strike is directly or indirectly responsible for much of the shortage of Pig Iron in the East, it is evident that even if there had been no strike the furnaces of this country would have been unable to meet the demand. Foreign sources of supply would have been drawn upon.

Business in Pig Iron and Steel Billets for importation continues quite heavy. The demand for Pig Iron comprises Bessemer as well as all grades of Foundry Iron. A sale of several thousand tons of foreign Bessemer is reported to have been made at \$22, Boston. The importations of Foundry Pig Iron are considerably swelled by commission houses purchasing for importation on their own account for the purpose of supplying their customers with Pig Iron needed for quick delivery. The report is incorrect that large orders for foreign Bessemer have been canceled because it has been found unsuitable for American use. Trouble arose in one case simply because specifications were loosely drawn. The quantity of foreign Billets now under consideration is reported larger than for several months. Quite a number of round lots were sold during the past week and further negotiations are in progress. German manufacturers have booked such a large amount of Billet business from this side that they are advancing prices. The conditions governing the foreign trade in Steel Billets are very peculiar, as it sometimes happens that if a mill is well supplied with orders for standard Billets the quotation on standard sizes will be advanced above that for odd sizes.

An interesting development with regard to the duty on Billets is reported from Philadelphia. It is well known that German manufacturers make two sets of prices on Iron and Steel products, one for the domestic market and a lower price for export. The Philadelphia customs officials announce that they will not hereafter recognize the German export price, but will base the duty on the price which German consumers have to pay. This will have the effect of advancing the duty on Billets possibly \$2.24 per ton if the Philadelphia decision is sustained.

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Foundry Pig No. 2, Local, Chicago	\$23.00	\$23.00	\$23.00	15.00
Bessemer Pig, Pittsburgh	\$21.75	\$21.75	\$21.75	15.75
Gray Forge, Pittsburgh	\$20.75	\$20.75	\$20.50	13.75
Lake Superior Charcoal, Chicago	\$26.00	\$26.00	\$26.00	17.00

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Steel Billets, Philadelphia	<i>\$27.00</i>	<i>\$27.00</i>	<i>\$27.50</i>	27.50
Steel Billets, Chicago	<i>\$29.50</i>	<i>\$29.50</i>	<i>\$29.50</i>
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O. Iron Rails, Philadelphia	25.00	25.00	24.00	19.50
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Barb Wire, f.o.b. Pittsburgh	2.50	2.85	2.90	2.90
Wire Nails, f.o.b. Pittsburgh	1.90	2.00	2.05	2.30
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Lead, St. Louis	3.97½	3.97½	3.97½	4.25
Tin, New York	25.30	25.80	27.05	24.25
Antimony, Hallett, New York	7.75	7.75	8.00	8.50
Nickel, New York	40.00	40.00	40.00	60.00
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Local Coke Foundry, No. 2.....	23.00 to 23.50
Local Coke Foundry, No. 3.....	22.50 to 23.00
Local Scotch, No. 1.....	24.00 to 24.50
Ohio Strong Softeners, No. 1.....	25.50 to 26.50
Southern Silvery, according to Silicon.....	24.10 to 24.50
Southern Coke, No. 1.....	24.15 to 24.65
Southern Coke, No. 2.....	23.65 to 24.15
Southern Coke, No. 3.....	23.15 to 23.65
Southern Coke, No. 1 Soft.....	24.15 to 24.65
Southern Coke, No. 2 Soft.....	23.65 to 24.15
Foundry Forge.....	22.15 to 22.65
Southern Gray Forge.....	21.65 to 22.15
Southern Mottled.....	21.65 to 22.15
Southern Charcoal Softeners, according to Silicon.....	27.15 to 27.65
Alabama and Georgia Car Wheel.....	27.00 to 27.50
Malleable Bessemer.....	24.00 to 25.00
Standard Bessemer.....	25.00 to 26.00
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon.....	27.60 to 28.60

Bars.—The market for Bar Iron has continued very quiet, there being few large orders for new business and light specifying on old contracts. The only sale of moment has been about 1400 tons at 1.85c., delivery extending into January, 1903; smaller lots are selling at 1.95c., Chicago. Soft Steel Bars have been in only moderate demand, but the market has continued steady without special feature. The following are the prices current: Soft Steel Bars, 1.75c. to 1.90c.; Hoops, 2.10c. to 2.25c.; Angles, 1.85c. to 1.95c., base, mill shipments. Even the demand for small quantities of Bars and Angles from store has been less active, Bar Iron selling at 2.25c., Soft Steel Bars at 2c. to 2.25c., Angles at 2.50c. and Hoops at 2.50c., from store.

Structural Material.—There has been a less urgent demand for Structural Material of all kinds for next year's delivery, but there have been moderate contracts placed by bridge works and contractors. There is considerable activity in preparing for large office structures in Chicago, one of which, if carried out according to plans projected, will require about 8000 tons of Structural Material. Mills are refusing daily orders for Angles, Beams and Channels which are desired for the current year delivery, but there has been more demand for foreign Steel, with sales of 300 tons of Beams and Angles on the basis of 2.15c., Chicago. The prices current for domestic Steel, mill shipment, are as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c. Dealers having local stocks find no difficulty in obtaining a premium of \$2 to \$5 per ton over prices quoted: Beams and Channels are selling at 2.50c. to 3.50c., Angles at 2.50c. to 3.50c. and Tees at 2.55c. to 3.50c. at local yards.

Plates.—The demand has continued very active, with some considerable business for delivery during the first six months of next year. The market has continued extremely strong. The following are the prices current: Tank Steel, 1/4-inch and heavier, 1.75c. to 2.25c.; Flange, 1.85c. to 2.35c.; Marine, 1.95c. to 2.50c. The demand for small quantities

for immediate shipment from local stocks or from mill continues urgent, and the following prices are readily obtained: Tank Steel, 1/4-inch and heavier, 2.30c. to 2.50c.; Tank Steel, No. 8, 2.45c. to 2.55c.; Flange, 2.50c. to 2.75c., all f.o.b. warehouse, Chicago.

Sheets.—No improvement is noted in the market for Light Sheets. The demand has continued active, but with free offerings and keen competition very low prices continue to be made, and the market is unsettled and feverish. The jobbing demand continues active, but prices remain unsettled. Prices are as follows: No. 27 Black Sheets sell at 3.05c. to 3.15c., mill shipment; small lots from store are offered at 3.25c. to 3.35c., Chicago. Mill shipments of Galvanized Sheets are held at 4.05c. to 4.25c., net, while small lots from store are selling at 4.30c. to 4.40c. for No. 27.

Cast Pipe.—There has been but little animation during the week, municipal contracts being few and far between, but there has been fair demand from railroads, with sales of about 1000 tons. The demand for small amounts from gas and water companies has been less active, but the market has not changed essentially. Manufacturers continue to sell small lots at the following prices: 4-inch, \$35.75 to \$36; 6-inch, \$33.75 to \$34; 8-inch and upward, \$33. Gas Pipe, \$1 per ton higher than Water, f.o.b. Chicago.

Billets.—There has been an improved demand for domestic Billets, with sales of 2000 tons of Open Hearth Basic, special analysis, at \$36 for delivery during the current year, a small portion of which will lap over into January. Smaller lots of similar Billets have been sold at \$38 to \$40, but the average run of Bessemer Billets are not quotable over \$32 to \$35 in 1000-ton lots. There is a rumor that 10,000 to 12,000 tons of foreign Billets have been closed on the basis of \$29.50 to \$30, Chicago, but this is not confirmed. There is still considerable inquiry, with various lots under negotiation, but an advance in freight rates ranging from 50c. to \$1 per ton has checked the buying movement.

Merchant Pipe.—The market has continued unsettled, with prices irregular, liberal discounts being offered for mill shipments by independent mills. The jobbing demand has been fair. The following are the prices current, random lengths, Chicago: Black, 1/2 to 1/2 inch, 56 1/2 off; 3/4 to 12 inches, 63 1/2 off; Galvanized, 1/2 to 1/2 inch, 43 1/2 off; 3/4 to 12 inches, 50 1/2 off.

Boiler Tubes.—There has been a fair demand, and the market has remained steady. Prices are as follows for mill shipment:

	Steel.	Iron.
1 to 1 1/2 inches.....	42 1/2	39
1 1/2 to 2 1/2 inches.....	55 1/2	38
2 1/2 to 5 inches.....	61	48
6 inches and larger.....	55 1/2	38

The moderate order demand experienced from store has been readily met at the following prices:

	Steel.	Iron.
1 to 1 1/2 inches.....	35	35
1 1/2 to 2 1/2 inches.....	47 1/2	32 1/2
2 1/2 to 5 inches.....	55	42 1/2
6 inches and larger.....	47 1/2	..

Merchant Steel.—There has been a fair degree of activity, with several contracts of moment for Tire, Spring Steel, Shafting, &c., a number of belated manufacturers covering contracts for next year. For mill shipment prices are as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 47 off in carload lots and 42 off in less than car lots. Ordinary grades of Crucible Tool Steel are quoted at 6 1/2c. to 7c. for mill shipment; specials, 12c. upward.

Rails and Track Supplies.—There is no cessation in inquiry for Rails for early delivery, and there is further evidence that a number of railroads have not yet covered their needs for 1903. The actual transactions closed, however, have not been large. There have been several orders from 1000 to 2500 tons, aggregating probably about 7500 tons, for next year's delivery. There is also under negotiation a lot of 20,000 tons for delivery during the last quarter of this year. Also one lot of 12,000 tons of foreign Sections for this year's delivery. There continues to be a good demand from electric railways. Light Rails have also been in fair demand. Official prices remain at \$28 for Standard and \$27 for Second Quality, mill shipment. The lighter Sections range from \$32 to \$35 in carload lots, according to weight and time of delivery. Jobbing quantities command a premium of \$3 to \$5 per ton. Track Supplies have remained in fair demand, and the market has continued firm at full prices, the following being the basis of sales: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Old Material.—In addition to the purchases of 50,000 tons of foreign Iron referred to a week ago, it is reported that local mills between September 1 and 15 purchased domestic and foreign Scrap in various amounts, also aggregating 50,000 tons, but during the past week or ten days there has been less activity, although sales of 1000 to 2000

ton lots are reported on basis of quotations. Two of the local mills have shut down during the past few days and in consequence the demand is less active, but there is no pressure to sell, the offerings being only moderate. Prices are well sustained, as previously quoted. Two thousand tons of Relaying Rails have been sold at \$32, Chicago basis. The following are the prices current per gross ton, Chicago:

Old Iron Rails.....	\$25.00 to \$25.50
Old Steel Rails, mixed lengths.....	19.00 to 19.25
Old Steel Rails, long lengths.....	23.50 to 24.50
Heavy Relaying Rails.....	31.50 to 32.00
Old Car Wheels.....	21.00 to 22.00
Heavy Melting Steel Scrap.....	18.50 to 19.00
Mixed Steel.....	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates.....	\$22.50 to \$22.75
Iron Car Axles.....	25.00 to 26.00
Steel Car Axles.....	23.50 to 24.00
No. 1 Railroad Wrought.....	21.50 to 22.00
No. 2 Railroad Wrought.....	19.00 to 19.50
Shafting.....	20.00 to 21.00
No. 1 Dealers' Forge.....	17.50 to 18.00
No. 1 Bushing and Wrought Pipe.....	15.00 to 15.50
Iron Axle Turnings.....	15.00 to 15.50
Soft Steel Axle Turnings.....	14.50 to 14.75
Machine Shop Turnings.....	14.25 to 14.75
Cast Borings.....	10.25 to 10.75
Mixed Borings, &c.....	10.50 to 11.50
No. 1 Bollers, cut.....	14.50 to 15.00
Heavy Cast Scrap.....	17.00 to 17.50
Stove Plate and Light Cast Scrap.....	12.50 to 13.00
Railroad Malleable.....	16.25 to 16.75
Agricultural Malleable.....	15.50 to 16.00

Metals.—Ingot Copper has developed a stronger tone, in sympathy with primary markets, and prices are higher, although there is no special activity. Lake is held at 12¼c. in car lots and 12½c. to 12¾c. in a jobbing way. Pig Lead has continued to sell well, and the market is firm at 4.05c. in 500-ton lots and 4.07½c. in car lots. Sheet Zinc has remained strong, with a good demand at 6½c. in carload lots and 6.65c. in lots of 600 lbs. Old Metals have sympathized with the markets for new material, reflecting a firmer feeling with a fair volume of business, but without essential changes in prices. The following are the prices current: Heavy Cut Copper, 10¼c.; Red Brass, 10½c.; Copper Bottoms, 9½c.; Lead Pipe, 3.90c.; Zinc, 3.75c.

Coke.—The only change in the market worthy of note is the obtaining of supplies from Colorado, which have assured an ample supply for foundries dependent upon this center, but furnaces have been unable to obtain assurances of a steady supply, and are therefore still banked. Sales have been made mainly at \$12 on track for Virginia Foundry Coke, and some contracts for a year's supply are reported to have been made on the basis of \$3 to \$3.50 at the ovens. It is significant that local agents for the Frick Company have been unable to take any appreciable business for the past three months, and they are not contracting for next year's delivery.

Cincinnati.

FIFTH AND MAIN STS., October 1, 1902.—(By Telegraph.)

The only features of the Pig Iron business which appear to be producing any comment whatever are the disagreeable things which have occupied the attention of the buyers and sellers alike for the past few months. The question of immediate supply of Pig Iron is not so pressing when it comes to the placing of new orders, but the trouble of getting Iron forward on old orders is as severe as it has been at any time, and just now the Coke situation is troubling everybody in a way that is far from assuring peace of mind to anybody in the business. Within the past day or two a representative of a prominent furnace interest from Birmingham has been looking around in this city, with a view of actually purchasing Coke for shipment South. Foundry Coke which usually comes to this market is now quoted, and in some instances selling where deliveries can be made on the basis of from \$8 to \$10 a ton at the furnace which, when freight is added, makes the maximum figure on Coke f.o.b. Cincinnati \$11.60, and at this price some has been sold. In regard to Iron for immediate delivery the market has not changed very materially, though it may be added that the demand for Sheet Iron is not so keen as it was. In support of this statement an agent here cites the fact that he had quite a little quantity of No. 2 Southern Iron come into his hands for disposal during the last week. In view of the fact that the amount was hardly large enough to justify traveling expenses he sent out circulars pretty generally to the trade offering it at \$22, Birmingham. So far the result of his circulars has been the sale of but one car. In regard to prices for next year there is no change whatever in the Southern product. Foreign Iron is being offered throughout the territory here at from \$25 to \$27 per ton, f.o.b., according to the amount of Silicon, which puts it about on a par with Southern Iron. Lafollette Furnace at Lafollette, Tenn., started in blast September 25, but as yet it has not been announced in this field who their agent will be. Freight rate from the Hanging Rock district is \$1.10, and from Birmingham to Ohio River points \$3.25. We quote, f.o.b. Cincinnati, for 1902 delivery, as follows:

Southern Coke, No. 1.....	\$26.25 to \$27.25
Southern Coke, No. 2.....	25.25 to 26.25
Southern Coke, No. 3.....	23.50 to 24.50
Southern Coke, No. 4.....	21.25 to 22.00
Southern Coke, No. 1 Soft.....	26.25 to 27.25
Southern Coke, No. 2 Soft.....	25.25 to 26.25
Southern Coke, Gray Forge.....	19.00 to 20.00
Southern Coke, Mottled.....	19.00 to 20.00
Ohio Silvery, No. 1.....	29.60 to 30.10
Ohio Silvery, No. 2.....	to
Lake Superior Coke, No. 1.....	26.10 to 26.60
Lake Superior Coke, No. 2.....	25.60 to 26.10
Lake Superior Coke, No. 3.....	25.10 to 25.60

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, chilling grades.....	\$26.75 to \$27.75
Lake Superior Car Wheel and Malleable.....	25.00 to 26.25

Quotations for first six months of 1903, f.o.b. Cincinnati, the buyer to assume freight difference which may exist at time of shipment, are as follows:

Southern Coke, No. 1.....	\$22.75 to \$24.00
Southern Coke, No. 2.....	22.25 to 23.25
Southern Coke, No. 3.....	21.75 to 22.75
Southern Coke, No. 4.....	21.25 to 22.25
Southern Coke, Gray Forge.....	21.25 to 22.25
Southern Coke, Mottled.....	21.25 to 22.25
Southern Coke, No. 1 Soft.....	22.75 to 24.00
Southern Coke, No. 2 Soft.....	22.25 to 23.25
Lake Superior Coke, No. 1.....	25.10 to 25.60
Lake Superior Coke, No. 2.....	24.10 to 24.60

Old Material.—The market is strong and active where the material can be had for delivery. We quote dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, \$21 to \$21.50 per net ton; Cast Scrap, \$17 to \$17.50 per gross ton; Iron Rails, \$24 to \$24.50, gross; Steel Rails, long, \$24 to \$24.50, gross; Steel Rails, short, \$18.50 to \$19, gross; Iron Axles, \$27.75 to \$28.25, net; Car Wheels, \$20.75 to \$21, gross.

Iron Bars.—The situation is quiet, and at the same time reasonably active. Prices are unchanged and no features worthy of comment noted. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.92c., with half extras. Less than carload lots, 2.02c., with full extras; Steel Bars, 1.72c. for carload lots, with half extras; Base Angles, 2.25c. Plates, 3-16 and heavier, 2.15c., carload lots.

St. Louis.

CHEMICAL BUILDING, October 1, 1902.—(By Telegraph.)

Pig Iron.—The Coke situation as affecting the output of the furnaces producing Pig Iron is the subject receiving most serious consideration at this time. Iron of all grades sold in this market from the Valley as well as Southern furnaces is being delayed greatly in the matter of delivery, and it is fast approaching a time when many foundries will be compelled to either curtail their production or shut down entirely. Very little new inquiry is reported, and it is perhaps as well, considering the conditions as they now exist. The following is the range of prices for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry.....	\$22.00 to \$24.50
Southern, No. 2 Foundry.....	21.25 to 23.75
Southern, No. 3 Foundry.....	20.75 to 23.25
Southern, No. 4 Foundry.....	20.25 to 22.75
No. 1 Soft.....	21.75 to 24.25
No. 2 Soft.....	21.25 to 23.75
Gray Forge.....	20.25 to 22.75
Southern Car Wheel Iron.....	20.25 to 22.75
Malleable Bessemer.....	to
Ohio Silvery, 8 per cent. Silicon.....	to
Ohio Strong Softeners, No. 1.....	to
Ohio Strong Softeners, No. 2.....	to

Bars.—Little change is to be noted in the demand upon the jobbing trade for Iron and Steel Bars, and present conditions are referred to as being fairly satisfactory. A meeting of the jobbers has just been held to decide on prices, and the decision was to make no change in the prevailing quotations. We quote from the mills: Iron Bars at 1.90c. to 1.95c., and Steel Bars at 1.90c. to 2. Jobbers quote Iron Bars at 2.25c., and Steel Bars at 2.25c.

Rails and Track Supplies.—General conditions and prices in this department of the market are unchanged. We quote as follows: Splice Bars at 2.10c. to 2.15c.; Bolts, Square Nuts, 3c. to 3.10c.; Hexagon Nuts, 3.25c. to 3.30c.; Spikes, 2.50c. to 2.60c.

Angles and Channels.—The demand and inquiry for Angles and Channels shows no remarkable increase in volume, but it is said to be of satisfactory proportions to the jobbers. For material of this class 2.50c. base, is the quotation.

Pig Lead.—No material increase is to be reported in the demand for Pig Lead, but in the matter of prices the firm tendency is well sustained. Chemical at 4c. to 4.02½c., and Desilverized at 4.05c.

Spelter.—The movement in the Spelter market has shown steady improvement, and prices have reached higher basis. Spot metal is quoted at 5.35c., and futures, October and November, 5.30c.

Philadelphia.

FORREST BUILDING, September 30, 1902.

The business situation is in a very confused if not critical condition, due to the unprecedented complications arising from the scarcity of fuel. But for the recklessness of a handful of unprincipled men, who for purposes of self advancement are causing suffering and distress in tens of thousands of homes, the country would be as prosperous as the most ardent optimist could desire, whereas things have been brought to a point at which there is imminent danger of a business collapse, the extent of which it would be unwise to attempt to discuss. The entire country is in a condition that would present a picture of unparalleled prosperity, but for a few men who are using and are permitted to use a horde of ignorant and vicious aliens to accomplish their own self seeking purposes. Business men are beginning to realize the enormity of the offense, and if they once rise in their might (and they are getting very near to the starting point) these men and their like will be swept away as by a whirlwind. Unthinking people fail to appreciate the wide reaching effects of this atrocious conspiracy, and if it is not promptly crushed business will be, and victims of cold and hunger will be seen in our streets to an extent hitherto unknown in the country which claims to be the land of the free, although exceptions may be taken as far as it applies to the Coal regions. This may be a digression from the usual report of the Iron markets, but Coal and Iron are so interwoven that when one is askew the other either is or soon will be, and the point has been reached when they must both go the same way, whether it be for better or for worse. Coke is now \$10 per ton (when it can be had) and Bituminous Coal \$8, but there is very little for sale, and when bought there is liable to be as much trouble in getting delivery as there was in making the purchase. No business can be conducted under conditions of that character, yet that appears to be the only alternative from a suspension of work until normal conditions are established. When this will be it is impossible to say, but the turning point is frequently found to be very close to the darkest hour, which, let us hope, is the one that is now passing.

Pig Iron.—For reasons already mentioned business during the past week has been very much restricted. Consumers recognize the fact that there is quite a possibility that they may not be in a position to melt much Iron during the next three or four weeks, hence for the time being contracts for new lots are not given serious consideration. Temporary requirements have to be filled, however, so that anything that is immediately available is taken at full prices of last week. Whether Iron is dearer or cheaper, or promises to be either one or the other, is hard to determine; all that can be said for a certainty is that spot Iron, or Iron for the last quarter of 1902, is salable at as high figures as at any time during the year. Business for 1903 does not appear to be seriously entertained by either buyer or seller. The shaking up of the last few years, and more specially of the last few days, has quenched the desire for long date operations, buyers being disturbed by totally unforeseen setbacks and sellers by the equally unexpected high costs of production. The market, however, is in good shape for immediate activity, if it has anything like a fair chance; but with so many opposing influences buyers are beginning to be very skeptical on that point, consequently their attitude is one of passive indifference. Notwithstanding the facts to which we have referred, there is a very fair movement in Pig Iron. Pushing for deliveries and picking up substitutes take up a good deal of time, and while the business may not be either profitable or agreeable every man is expected to do his best to keep things afloat until the fog clears. A decreased consumption is noticeable in the easing off in the demand for early deliveries of Pig Iron, and if the Coke famine continues the tendency to which we refer may develop very rapidly, as everything is used close up, and Coke is just as essential as the metal. However, there is no surplus of Iron yet, and if Coke can be had there will be no trouble about Pig Iron. Philadelphia importers are selling a good deal of material to the New England trade, and by judicious distribution the shortage of American Pig is sensibly mitigated. Shipments via Boston and New York make quite a saving in freights to these distributing points, while those to Philadelphia are delivered direct to the city and adjacent districts. Prices are about the same as last week, a little firmer perhaps in some cases, but as a rule business can be done at about the following figures. General quotations are as follows: Cargo lots, c.i.f., at about \$19.50 for Middlesbro No. 3; small lots, \$20.50 to \$21; Scotch, alongside ship, \$22.50 to \$23.50. Scotch Iron ranges from \$22.50 to \$23.50 and American at about the same figures as last week for city or nearby deliveries during the first half of next year and 75c. to \$1 more for this year's deliveries.

No. 1 X Foundry	.....	\$23.50 to \$24.50
No. 2 X Foundry	.....	22.00 to 22.50
No. 2 Plain	.....	21.00 to 22.00
Standard Gray Forge	.....	19.50 to 20.50
Basic	.....	20.50 to 21.00
Low Phosphorus	.....	25.50 to 26.00
No. 3 Middlesbro	Prompt shipments	21.00 to 21.50
Scotch Irons	or spot.	23.00 to 24.00

Billets.—Prices are unsettled, but they are higher than they were a couple of weeks ago, although buyers are not prepared to make much of an advance. At \$27 to \$27.50 for foreign some business might be done, but sellers are trying to get about \$28 for this year's shipments. American is \$3 to \$4 dearer than foreign, but unless for special Steel foreign monopolizes most of the market for the time being. Objections are made to German Steel coming in at the special figures quoted for the export trade. This ruling is based on the fact that Germany has a price for the home trade and a lower one for export business. The customs authorities here are therefore holding Steel for an additional duty of \$2.24 per ton.

Plates.—There is a heavy demand, and prices are being firmly maintained, concessions having been asked for by purchasers of large tonnages, but bids of that kind are not accepted. The mills are crowded with work, and the daily demand is sufficient to keep them going at their full capacity. Quotations unchanged from last week—viz.: Small lots, 2.10c. to 2.15c.; carload lots, 1/4-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c.; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C. H. No. 1, 2 1/2c.; C. H. No. 1 Flange, 3c.; C. H. No. 1 Flange Fire Box, 3 1/2c.

Structural Material.—There is a good demand, and in some cases 2.25c. to 2.50c. is obtained for immediate deliveries, although ordinary specifications can be done at 2.10c. to 2.15c. for foreign, ex-ship. The stringency in the supply has been greatly modified by the large imports, and for next year's deliveries prices are quoted at 1.72c. to 1.80c., but for prompt shipments mill specifications command all the way from 2.35c. to 2.50c. Store lots can be had of most of the leading sizes, and for direct importations of large lots 2.10c. to 2.15c. could be done. The official figures based on Pittsburgh quotations are 1.72c. to 1.80c., but these are for deliveries at some period in the indefinite future.

Bars.—There is a fair movement in the Bar Iron trade, and most of the mills are running full. The amount of business on hand, however, is not as large as it has been, so that new orders for good sized lots are taken at inside figures when deliveries and specifications are attractive. Steel Bars still command 2c. and over for prompt shipments from local mills, but Western Steel can be had at about 1.80c., if deliveries during the current year are not strictly specified. Bar Iron brings 1.92c. to 1.97c. for carload lots as a minimum quantity, tone of market steady.

Sheets.—Business is very dull, and prices are weak and irregular. The reduction announced by the American Sheet Steel Company was not unexpected and had already been discounted by most of the outside mills. At the present time it is hardly possible to give exact quotations, as a great deal depends on quantity and time for delivery as well as the quality of the material that is asked for.

Old Material.—There is a good demand, and material is well taken at last week's prices. In some cases slight advances have been paid for quick deliveries. The offerings are not large, however, the following being a fair average for lots delivered in buyers' yards:

Old Steel Rails	.....	\$21.50 to \$22.00
Heavy Steel Scrap	.....	20.50 to 21.00
Low Phosphorus Scrap	.....	26.50 to 28.00
Old Steel Axles	.....	26.00 to 27.00
Old Iron Rails	.....	25.00 to 26.00
Old Iron Axles	.....	30.00 to 31.00
Old Car Wheels	.....	19.75 to 20.50
Choice Scrap, R. R. No. 1 Wrought	.....	24.00 to 25.00
Country Scrap	.....	21.00 to 22.00
Machinery Cast	.....	19.50 to 20.50
No. 2 Light Scrap	.....	17.00 to 18.00
No. 2 Light Scrap (Ordinary)	.....	14.50 to 15.00
Wrought Turnings	.....	16.00 to 17.00
Wrought Turnings, Choice Heavy	.....	18.00 to 18.50
Cast Borings	.....	10.00 to 10.50

W. E. Leon, who has held a confidential position with C. B. Houston & Co. of this city for the past ten years, has been admitted to a partnership in the firm. Their specialties, as heretofore, will be Finished Material, Old Material and Coal and Coke.

Cleveland.

CLEVELAND, OHIO, September 30, 1902.

Iron Ore.—Delays to boats engaging in the Ore trade are increasing, and it is now with the utmost difficulty that the vessels are able to discharge their cargoes. In many instances the delays have amounted to ten days. The result is that the volume of Ore business is decreasing, and the delays are withholding vessels from the trade at the head of the lakes where they are needed to offset the withdrawal of boats to enter the other trades, now increasing in volume. The withdrawal of tonnage from the Ore trade and the delays at the lower lake ports have not been sufficient to advance the prices, which is something of an indication of the surpluse of boats during the summer. All of the Ore that is brought down the lakes hereafter this year will be in excess of last year's movement, as the total lake shipments to date have equalled the lake and rail shipments of a year ago. The movement of 3,000,000 tons from

now on will be an easy task. The shippers, however, have not sold quite 24,000,000 tons of Ore, and some small lots will likely be sold before long. The sales also are likely to be increased, as it is now learned definitely that the shipment of Canadian Red Hematite Ore from the Michipicoten district will not be as heavy as anticipated. Prices hold as they have been at \$4.25 for Bessemer old range, and \$3.25 for non-Bessemer old range and Bessemer Mesaba, and \$2.75 for non-Bessemer Mesaba. Rates of carriage are stable at 75c. from Duluth, 65c. from Marquette, and 60c. from Escanaba.

Pig Iron.—Two furnaces in the Valleys banked their fires Monday morning because of the Coke shortage, and the report was that unless material relief came immediately others would also have to go out of blast. Of the two one produced Basic and the other Foundry Iron. The shortage of Coke seems to be due to the lack of railroad equipment, as the reports from the Coking ovens are that they have material collected there which they have no facilities to move. This development came at the time when many of the furnacemen had been given to understand that the transportation problems were mending and that the Coke supply would be materially improved before long. Since the natural assumption is that the railroad situation will not improve materially during the winter—conditions then being worse instead of better—the outlook is not very bright for Pig Iron production. The immediate result has been the almost complete withdrawal of the foundry producers from the market as sellers of Pig Iron for spot delivery. Any one having any material for sale would have little or no difficulty in getting \$25 for No. 2 at the furnace. Offers of that amount have been frequent, but the material did not appear in any volume. Considerable activity has been seen in future transactions, and the market is strong. The prospects of a shortage of Pig Iron during the first half of next year has affected the price. No difficulty is being experienced in getting \$22, Valley furnace, for No. 2. Two present conditions have a bearing on the future market. The consumers having contracts are upon the open market looking for material for this year's delivery, because the furnaces upon which they have relied cannot supply it. The general demand for shipment on contract has seldom been heavier. The inability of the furnaces to make these deliveries will throw the fulfillment of many of those contracts into next year. The present needs, however, are being supplied in a measure by importations, which are being increased steadily, although in many instances the grade of Pig Iron is not such as can be used to advantage by the consumers. The importations tend to offset the tendency of present market conditions to pile upon the furnaces more than they can do during the first half of next year. There is also some demand for Pig Iron for delivery during the third quarter, but there is a manifest tone of uncertainty about that market. Within a year 25 furnaces will go in service, which will draw their Ore supply from the Lake Superior region and therefore sell their product most naturally in this territory, or as near home as possible, while such a market lasts. Most of these stacks are large and their output will tend to change the relation between supply and demand. Bessemer Iron for spot delivery has taken a jump again, and \$23 in the Valleys is easily obtained now, with \$22 being quoted for future delivery, or before July 1 next year, although the association has taken no stand as to price. Basic is about off of the market for this year with, however, a nominal quotation of \$21 in the Valleys for this year's delivery and the same for the first half of next year.

Finished Material.—The slight concession to favored buyers made by the Sheet producers brought out a volume of business that was quite satisfactory. It was understood that the lower price would prevail only until October 1, and no advices have been received which would indicate any intention to continue the quotations after that date. It seems entirely possible, however, that the lower figures will be withdrawn for the present at least, as the mills have taken enough orders to tide them over. The mills, however, seem to have established a precedent which will be a guide to buyers in making future purchases. The reports of the price asked and obtained for material do not change from what they have been of late, although it is known that these have been shaded. The quotations therefore remain at 3.10c. to 3.20c. at the mills for No. 27 Black Sheets as a basis for all gauges, the same out of stock bringing 3.35c. to 3.50c. The stock quotations on Galvanized Sheets are also based on 4.50c. for No. 27. The Plate trade is picking up some and the market is very strong. Universal Plates out of stock have been selling for some time at 2.50c. and the supply is exhausted. Sheared Plates out of stock have been selling at 2.25c., but since all of the sources of supply around Cleveland have been selling at a higher price the Cleveland jobbers have also marked their product up, and now Sheared Plates here are selling at 2.50c. for $\frac{1}{4}$ inch, with 3-16 inch selling at the usual 10c. advance over $\frac{1}{4}$ inch quotations. The mills for spot delivery have no difficulty in getting 2c. at the mill, especially since they are

making promises of deliveries in from five to six weeks. A mill in the Pittsburgh district accepted a contract for 1000 tons of Structural Shapes during the past week, the material to be used in building the new home for the Union Club of Cleveland. Other sales have been made for future delivery altogether at the old prices of 1.70c. The jobbers and the smaller mills are doing considerable spot business now on premium prices. The jobbers are getting 2.50c. to 3c. for all of the material they sell, and the mills are having very little difficulty in getting 2.60c. for their material at the mill. The spot business, of course, is limited. No premium material has been contracted for as yet entailing delivery into next year. Steel Bars are strong and Bar Iron is weak. Bar Steel has been sold up for the entire year, with big demands on the producers for such Steel as has been ordered for this year's delivery. Prices do not change from 1.80c., Pittsburgh, for Bessemer, and 1.70c., Pittsburgh, for Open Hearth. Bar Iron producers are looking for business, and the mills are still producing more than the market calls for. The price is therefore weak, and it is understood that many of the mills are taking orders under the announced price. The nominal quotation is 1.80c., Pittsburgh, although that could be shaded on choice orders. The Billet market has changed somewhat during the past week. The importation of Bessemer Billets at \$28 delivered has had a tendency to relieve the strenuous demand for that material which existed earlier in the year. But one or perhaps two of the larger mills have any surplus, but they are not offering the Steel for sale. The fact that Tin Plate operations have been curtailed to a certain extent has made Bessemer Billets more plentiful, but rather than place them on the open market the producers have turned them into the production of other finished forms. This change being acceptable to the consumers the surplus was easily taken care of. As for the imported material it is understood that the consumers here do not take kindly to it, but whether it is due to the lack of faith in the analysis or other causes does not appear. Very little is heard now of Rail sales other than that an inquiry comes in from time to time for material, and the mills have not yet stopped taking orders for next year's delivery. Light Rails are still in demand for this year's use, but the supply is quite limited. The price of Standard Rails is still \$28, and that of the Light Rails has held at \$38 to \$40.

Old Material.—The Scrap market has continued to boom this week, with a steady demand for both Mill and Cast Scrap. The prices remain as follows: No. 1 Wrought, \$21, net; Iron Rails, \$27.50, gross; Iron Axles, \$28, net; Cast Borings, \$12, gross; Wrought Turnings, \$16.50, gross; Cast Scrap, \$17.50, net; Car Wheels, \$19, gross; Heavy Melting Steel, \$19, gross; Old Steel Rails, \$20, gross.

Esterly & Clancy, Cleveland, Ohio, have recently entered the field as Iron and Steel brokers, with office at 409 Superior Building. They are both men of experience, having been for several years connected with one of the largest jobbing Hardware houses in Cleveland. They represent a number of independent Tin Plate and Sheet mills, are local representatives for several large manufacturing concerns in other lines, and also are agents for several American and Canadian Pig Iron companies. They recently negotiated a deal of considerable size for the importation of English Pig Iron.

Pittsburgh.

(By Telegraph.)

PARK BUILDING, October 1, 1902.

Pig Iron.—The market continues exceedingly strong, but not a great deal of metal is selling, as consumers are pretty well covered for the balance of this year, and some of them well into next year. Coke shipments continue more satisfactory than for some time. Prices now quoted on foreign Iron are so high that it is not likely there will be much done in this direction in the future. If Coke shipments continue good, domestic furnaces will likely be able to meet the demand for Iron, large as it is at the present time. We quote Bessemer Pig Iron for shipment over balance of this year at \$22 to \$22.25, Valley furnace, and note sales of about 15,000 tons at these prices. Forge Iron is fairly firm at \$21, Valley, or \$21.75, Pittsburgh. No. 2 Foundry Iron for shipment this year is held at about \$23, at furnaces, or \$23.75, Pittsburgh. Foundries are covered pretty well ahead on Iron, and there is not much buying. No. 2 Foundry for shipment, first quarter of next year, is held at \$21.50 to \$22, at furnace.

Steel.—A leading Steel mill that bought 10,000 tons of foreign Billets some time ago, is said to be figuring on buying another similar lot, but the deal has not been closed yet. There is fair inquiry for Billets and Sheet Bars, and the market is stronger than for some time. We quote foreign Billets at \$29.50, Pittsburgh, and domestic Billets at \$31, Pittsburgh. On a firm offer and for extended delivery domestic Billets might be bought at lower price.

(By Mail.)

The unfavorable condition of the money market is not reflected to any great extent in the Iron trade, which continues in a fairly satisfactory condition, although some disappointment exists over the fact that demand for Sheets, Tin Plate and Wire products does not show much improvement. Pig Iron continues very firm, and small lots of Bessemer for immediate shipment have sold at \$22, at Valley furnace, and higher. Demand for Steel is not very active, foreign being held at about \$29.50, Pittsburgh, and domestic at \$31 or less. Plates and Structural Shapes are extraordinarily active, and the mills are sold up for months ahead. The Coke situation is more satisfactory than for some time, and the furnaces are getting almost a full supply of fuel. It is believed a better demand will soon come for Sheets, Tin Plate, Wire and Wire Nails, which have been quite dull for some time. In fact, a slightly better demand for Wire products is already noted from some quarters.

Ferromanganese.—A sale of 50 tons of English Ferro is reported at \$51, Pittsburgh, which may be considered the market for English and German.

Spelter.—Prompt deliveries of Spelter are very difficult to obtain, and the market is strong. We quote prime grades of Western Spelter at 5.36c., Pittsburgh, for early delivery.

Muck Bar.—We note a sale of 3000 tons of domestic Muck Bar for first quarter delivery at \$36, Pittsburgh. Eastern Muck Bar continues to be offered at lower prices and it is said foreign Muck Bar is being offered as low as \$32, Pittsburgh. Aside from one sale of 8000 tons of foreign Bar, none of which has yet been delivered, we do not hear of any further transactions in this market.

Plates.—The situation in Plates could not be better. Tonnage is heavy and the leading interest is practically out of the market as a seller of Plates for first half of next year. Other mills cannot promise deliveries inside of two to three months, and Eastern mills are quoting Plates at 2c. in this market and in some cases are getting it. Local mills have been compelled to refuse a very large tonnage at prices as high as 1.85c. to 1.90c., being unable to make deliveries wanted. No change in prices is expected to be made at the meeting of the Plate Association on October 9, as the leading mills will continue to pursue a conservative policy in the matter of prices, the wisdom of which has been repeatedly demonstrated in the past. We quote Plates, 1/4-inch and heavier, at 1.85c. to 2c., Pittsburgh, for delivery this year. Official prices, which pertain only to Plates for shipment in next year, are as follows: Tank Plate, 1/4 inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, \$2 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

Structural Material.—The leading mills are pursuing a very careful policy in the matter of taking contracts for Structural Shapes for next year, and unless the buyer can actually show that the tonnage desired will be taken out the contract in most cases is refused. The American Bridge Company are said to be filled up on bridge work for the first six months of 1903, having taken contracts in the past two weeks for nearly 30,000 tons of this class of work, all for 1903. Other bridge interests report an extraordinary demand for bridge work and buildings, and McClintic-Marshall Construction Company, Columbia Bridge Company, Fort Pitt Bridge Works, Ritter-Conley Mfg. Company and other local Structural concerns have work for months ahead, and the outlook could not be better. Small lots of Beams and Channels bring 2.50c. to 3c., and in some cases buyers are willing to pay more, if guaranteed prompt shipment. Official prices, which are quoted only on tonnage for delivery in next year, are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inch, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c. to 1.85c.

Sheets.—The Black and Galvanized Sheet market continues in an unsatisfactory condition, both as regards demand and prices. Sheet capacity is now so large that it takes a very heavy demand to keep the mills filled up, and this demand is lacking just now. Unless tonnage soon improves some of the small Sheet mills that do not have their own Steel will have to shut down. Prices on Galvanized are more unsatisfactory than on Black Sheets, and the high prices ruling for Spelter and Steel leave, it is claimed, very little profit. We continue to quote No. 27 Black Sheets, box annealed, one pass through cold rolls, at 2.85c. to 2.90c., and No. 28 at 2.95c. to 3c. Galvanized Sheets are 75 and 10 to 75 and 7 1/2 off, but the lower price is obtainable only on good orders. There are reports of lower prices having been made on both Black

and Galvanized Sheets than are quoted above, but these have not been authenticated. All the above prices are f.o.b., maker's mill.

Rods.—There is not a very large demand for Rods, and we quote Bessemer at \$36 and Open Hearth at \$37, Pittsburgh.

Bars.—Several of the leading mills advise us that Implement makers are specifying more liberally on contracts, and the situation in this respect is somewhat improved. There is a moderate tonnage in both Iron and Steel Bars being placed, and the mills are pretty comfortably filled for some time ahead. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size are subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra, regardless of length. We quote Iron Bars at 1.80c. to 1.85c. in carloads and 1.90c. in small lots, f.o.b. Pittsburgh, half extras as per National card.

Merchant Steel.—The Shafting Association will meet in New York on Wednesday, October 8, but it is not believed there will be any change in prices. Specifications on contracts are coming in quite freely, and a good demand is reported for Machinery, Toe Calk and Tool Steel. Prices show no change, and we quote: Tire, 2.15c. to 2.25c.; Spring, 2.25c. to 2.35c.; Toe Calk, 2.30c. to 2.40c., base; Sleigh Shoe, 2.15c. to 2.25c. Differentials are as follows: Less than 2000 lbs. of a size and not less than 1000 lbs., 10c. advance; less than 1000 lbs. of a size, 30c. advance; Cold Rolled Shafting is 47 per cent. off in carloads and 42 per cent. in less than carloads delivered in territory east of the Mississippi and north of the Ohio rivers. Tool Steel is 6 1/2c. to 10c. for ordinary grades and 12c. and upward for special grades.

Hoops and Bands.—There is more or less unevenness in prices, and tonnage is not as heavy as the mills would like to see it. We quote Hoops at 1.90c. for 250-ton lots and over and 2c. in carloads. Bands are 1.90c. for Bessemer stock, 12-gauge and heavier, while for Open Hearth stock \$2 per ton advance is charged.

OBITUARY.

ASA L. FOWLER.

Asa L. Fowler, an old and valued employee of H. D. Smith & Co., Plantsville, Conn., died at his home in that place September 23. He was born in Haddam, Conn., 60 years ago, remaining in his native town after finishing his education until 1862, when he enlisted in the Twenty-fourth Regiment, Connecticut Volunteers, serving in the Army of the Gulf. After leaving the army he went to Plantsville, where he was employed by H. D. Smith & Co., having been at the head of one of their departments ever since.

NOTE.

JOSEPH P. WEATHERBY, proprietor of the Camden Machine Works, Camden, N. J., died September 20, at his home in that city, from an attack of apoplexy. He had been engaged in the machinery business for over 40 years.

PERSONAL.

F. H. Treat, superintendent of the Bessemer department of the American Iron & Steel Works of the Jones & Laughlin Steel Company, on the South Side, Pittsburgh, has resigned.

R. H. Perdue, lately advertising manager of the Cleveland Leader, has been elected vice-president of the Gobeille Pattern Company, Cleveland, Ohio, and will take charge of the advertising and credits of the company.

Joseph Joseph of Cincinnati returned from abroad this week, arriving in New York on Tuesday afternoon. He had been absent for four months traveling through England and the Continent.

P. T. Berg, for many years chief chemist of the Carnegie Steel Company, at Pittsburgh, has resigned and will hereafter reside in his native city of Stockholm, Sweden. Mr. Berg was given a complimentary dinner at the Hotel Schenley on Saturday night by his former associates at the Homestead Steel Works.

Central Pennsylvania News.

HARRISBURG, PA., September 29, 1902.—Furnaces banked in almost every Valley and foundries compelled to turn down business because of uncertainty of fuel supply is the situation in Central Pennsylvania. There is no lack of business. There is plenty to be had, but the foundrymen and mill owners are in despair about coke and coal and refuse to make promises as to deliveries. The great works are badly inconvenienced and the conditions do not promise to improve very much before the end of the strike, and then there may be such a rush for cars to ship anthracite that the railroads will be congested worse than ever.

The Pennsylvania, Lackawanna, Susquehanna and other steel companies did not make nearly their usual production of pig iron in September, because of the inability to get fuel as needed. Many days were lost by banking.

The Pennsylvania Steel Company are in good shape except for the supply of coke. There have been considerable receipts of material and the number of men employed is about 8000.

There have been stirring times in Lebanon the last ten days because of the strike in the puddle mills of the works of the American Iron & Steel Mfg. Company and troops have been guarding the works. As this is written there are signs of settlement of the difficulty.

Lancaster County has suffered from the coal strike and its attendant troubles, but most of the mills have kept going. Northumberland, Cumberland and York counties have felt the coke shortage and several of York's foundries have been compelled to pass on orders. The York concerns have a great deal of work on the books. Many building projects in Harrisburg and nearby cities have been postponed until next year because of uncertainty of securing material.

Pennsylvania State Bridge Contracts.

In this city last week the Pennsylvania Board of Commissioners of Public Buildings and Grounds let the contracts for 18 bridges, all of which are to replace structures destroyed by fire, ice or flood within the last year. Under a recent act of the Legislature the State must rebuild all public bridges which are ruined by natural causes, provided the bridges cross streams which are navigable for ordinary traffic. The contracts were awarded as follows:

Nelson & Buchanan, Chambersburg, Pa., contracts for Masontown Bridge, Bedford County, \$24,000; Taylorsville Bridge, Bradford County, \$25,000; Old Forge Bridge, Lackawanna County, \$6000; Lycoming Bridge, Lycoming County, \$19,000; Tuscarora Bridge, Juniata County, \$16,660; Loyalsock Bridge, Lycoming County, \$19,144; Tionesta Bridge, Forest County, \$21,000; Brookville Bridge, Jefferson County, \$20,447.

Penn Bridge Company, Beaver Falls, Pa., contracts for Honesdale Bridge, Wayne County, \$40,745; Mang's Bridge, Wayne County, \$6939; Sugar Creek Bridge, Bradford County, \$21,690; Tunkhannock Bridge, Wyoming County, \$141,375.

National Bridge Company, New York, contract for Bowmanstown Bridge, Carbon County, \$63,900.

York Bridge Company, York, Pa., contract for Cross Keys Bridge, Schuylkill County, \$19,250.

W. H. Gulick, Phoenixville, Pa., contract for White Haven Bridge, Carbon County, \$80,460; Mumfreville Bridge, Clearfield County, \$26,100. E. J. S.

The first public test of the Heroult electric steel process was lately made at La Praz, France, by the Société Electrometallurgique Française. The furnace has two parallel vertical electrodes. From a mixture of scrap and rich ore a cast of 2.20 metric tons of steel was made in seven to eight hours, the power required being about 400 horse-power. Heroult is well known as the inventor of the process of manufacturing aluminum which bears his name.

At a recent meeting of the directors of the Chicago Pneumatic Tool Company an appropriation was made to

enlarge the Detroit plant in order to relieve the pressure of the company's rapidly increasing business. The addition projected will increase the company's capacity one-third. The Detroit plant and the Franklin, Pa., air compressor plant are running night and day.

August Imports and Exports.

The imports of iron and steel into this country for which quantities are given are reported as follows by the Bureau of Statistics for the month of August, compared with August, 1901:

	August,	
	1901.	1902.
	Gross tons.	Gross tons.
Iron ore.....	122,830	113,788
Pig iron.....	4,301	79,447
Scrap iron and steel fit only to be manufactured.....	4,363	13,759
Bar iron.....	2,424	2,516
Bars, railway, of iron or steel, or in part steel.....	18	1,988
Hoop, band or scroll.....	347	311
Ingot, blooms, billets, &c., n.e.s.....	746	39,027
Sheet, plate and taggers iron or steel.....	794	363
Tin plates, terne plates and taggers tin.....	8,448	2,807
Wire rods.....	1,726	1,663
Wire, and articles made from.....	160	233
Total, excluding ore.....	23,327	142,116

The exports for the same months were as follows:

	August,	
	1901.	1902.
	Gross tons.	Gross tons.
Iron ore.....	13,605	24,654
Pig iron.....	2,230	2,531
Scrap and old, fit only for manufacture.....	2,343	519
Bar iron.....	673	359
Bars or rods of steel:		
Wire rods.....	619	5,014
All other.....	1,713	847
Billets, ingots and blooms.....	275	464
Hoops, band and scroll.....	16	47
Steel rails.....	18,304	5,569
Sheets and plates:		
Iron.....	307	490
Steel.....	1,220	1,197
Tin plates, terne plates and taggers tin.....	4	86
Structural iron and steel.....	2,021	2,904
Wire.....	5,573	7,114
Totals, excluding ore.....	35,298	27,141

Trade Publications.

Reflex Water Gauge.—Wm. T. Bonner & Co., whose offices are located at 53 State street, Boston, and 141 Broadway, New York, are sending out a four-page folder exploiting the Reflex water gauge (Klinger's patent). This gauge is especially adapted to locomotives, portable engines, land and marine boilers. Its construction is such that the water appears black, while a reflector shines with a silvery luster showing the steam. In addition to the folder an index card is sent, which is of proper size and shape for filing in standard card index cabinets.

Machinery Stock List.—Wickes Brothers, machinery manufacturers, &c., dealers in second-hand machinery, Saginaw, Mich., are issuing monthly stock lists showing the complete line of new and second-hand machinery at their various warehouses at the time of publication. The September list includes several hundred machines of almost every variety. Each machine on the list is regularly numbered to simplify the sending of orders. Preceding the number there is an initial which designates the location of the tool or machine; the letter P, for instance, denotes that the stock is in Pittsburgh, Y denotes stock in New York, &c. The company have three branch offices, located as follows: 1214 Marquette Building, Chicago, Ill.; corner Forty-fifth street and A. V. Railway, Pittsburgh, Pa.; 95-97 Liberty street, New York, and sales warehouses at Saginaw, Mich.; Pittsburgh, Pa., and Jersey City, N. J.

A four-page folder is being sent among the trade by the Henry L. Schwarzenberg-Rath Company of 407 Cuyahoga Building, Cleveland, Ohio. It contains a large amount of useful information for track construction, such as tables showing the amount in tons of rails of various patterns required to lay 1 mile of track. Other tables show the number of track bolts in a keg of 200 pounds and the number of kegs required per mile, the number of complete joints to the ton of rails and other data regarding spikes, cross ties, splice plates and bolts, &c.

New York.

NEW YORK, October 1, 1902.

Pig Iron.—Foundrymen are well covered by contracts for their requirements running into the first half of next year, and the purchases now being made are simply to cover deficiencies in delivery. The sales thus made have largely consisted of foreign iron, as has been the case for several weeks. The transactions for importations have covered considerable quantities of various grades of iron running from Middlesbrough No. 3 up to the highest grade of Scotch Irons, together with some low phosphorus pig iron. The condition of the demand for small quantities has been such as to lead to extensive importations of foundry iron by commission houses on their own account for the purpose of supplying customers who need quick delivery. For delivery in 1903 the following quotations are made: Northern Iron, at tidewater, No. 1 X, \$23.25 to \$24.75; No. 2 X, \$22 to \$22.75; No. 2 Plain, \$21 to \$21.75. Tennessee and Alabama brands, in New York and vicinity: No. 1 Foundry, \$23.25 to \$23.50; No. 2 Foundry, \$22.25 to \$22.50; No. 3 Foundry, \$21.50 to \$22.

Cast Pipe.—An unusually active general demand is reported. Large quantities are not now wanted to any extent, but the demand for small lots is widespread. The Eastern foundries are still having much trouble in securing a sufficient supply of materials and are unable to take all the business offered them. Prices are steadily advancing as a result of increasing cost, and quotations are now as follows: 6-inch, \$36, and 8 to 12 inch, \$35.50, gross ton, at tidewater.

Steel Rails.—While considerable inquiry for rails is noted no transactions of special consequence have occurred since last report. It is estimated on good authority that foreign manufacturers of steel rails have made sales aggregating 300,000 tons up to this time for delivery on this continent, comprising sales made to the United States, Canada and Mexico.

Manufactured Iron and Steel.—Several important contracts for bridge work are in the market and will probably be closed very shortly. The prospects in this line continue as bright as at any previous time. It is noteworthy that foreign inquiries for bridge work are picking up. This is interesting, as it possibly indicates that bridge works abroad are in better shape. The general situation as to finished iron and steel continues as previously reported, with the exception of light sheets on which a reduction of \$5 per ton has been made this week by the leading manufacturers. We quote, at tidewater, as follows, but for small lots and prompt delivery much higher prices are being obtained for structural material and for plates: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c. Sheared Steel Plates are 2c. to 2.10c. for tank, 2.10c. to 2.20c. for flange, 2.25c. to 2.40c. for fire box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.95c. to 2.10c. Foreign Beams are 1.80c. and Angles 1.90c., ex-ship, New York, in 500-ton lots or greater.

Old Material.—The danger of strikes in the West is interfering with the demand from that section. Railroad companies have not much material to sell and consequently no increase in the available stocks is pressing on the market. Considerable trouble is experienced with imported scrap. It looks as if little more would be brought in. Prices have gone up abroad, and the grading of iron and steel scrap and even of rerolling rails is not up to our standard. Steel rails of long lengths for rerolling are stated to have so many holes punched in the web that the waste is a great deal larger than in domestic rails, consequently they are not now regarded with favor. Slight changes are observed in quotations, which are as follows, per gross ton, f.o.b. cars in this vicinity:

Old Iron Rails.....	\$22.50 to \$24.00
Old Steel Rails, long lengths.....	22.00 to 23.00
Old Steel Rails, short pieces.....	19.50 to 20.00
Relaying Rails, heavy sections.....	29.00 to 30.00
Relaying Rails, lighter sections.....	34.00 to 35.00
Old Car Wheels.....	20.00 to 21.00
Old Iron Car Axles.....	27.00 to 28.00
Old Steel Car Axles.....	27.00 to 28.00
Heavy Melting Steel Scrap.....	19.50 to 20.00
No. 1 Railroad Wrought Scrap Iron.....	22.50 to 23.00
Track Scrap.....	20.00 to 21.00
Busheling Scrap.....	15.00 to 16.00
No. 1 Machinery Cast Scrap.....	19.00 to 20.00
Stove Plate.....	12.00 to 13.00
Wrought Turnings, delivered at mill.....	16.50 to 17.50
Cast Borings, delivered at mill.....	10.00 to 10.50

The Vulcan Crucible Steel Company of Pittsburgh are making a number of extensive additions to their plant at Allquippa, Pa. These include 10 and 14 inch mills and a number of steam hammers, which will considerably increase the capacity of the works in the manufacture of fine crucible tool steels.

Metal Market.

NEW YORK, October 1, 1902.

Pig Tin.—Continued declines have characterized the market. Yesterday spot went as low as 25.50c., and to-day a further decline brought prices as follows: Spot, 25.30c. to 25.40c.; October, 25.10c. to 25c.; November, 24.90c. to 25.05c.; December, 24.50c. to 24.75c. On Friday and Saturday last business was a little more active than it has been for some time. The reason for this was some speculative buying for this year's delivery. The London market also declined somewhat, the closing prices to-day being 30 points lower than yesterday, and as follows: Spot, £115 12s. 6d.; futures, £114. The statistics for the month of September show deliveries of 2600 tons. This is a further decrease of 300 tons since last month. The possible supply shows an increase of nearly 1700 tons since September 1. It now amounts to 18,025 tons, against 17,611 tons for the same period of last year.

Copper.—The market is dull, with prices lower. No business of any consequence is being transacted. Buyers and sellers are waiting. The business done during the week under review was only in small lots for home consumption. At the close to-day the following prices prevailed at spot to December delivery: Lake, 11.55c. to 11.75c.; Electrolytic, 11.45c. to 11.55c.; Casting, 11.40c. to 11.50c.; Standard, 10.75c. to 11c. Statistically, the position has not improved. The statistics for August show a further accumulation in supplies of 5821 tons, bringing the surplus on September 1 to 110,780 tons. During September the exports amounted to 12,354 tons, and the imports at Atlantic ports aggregated 4645 tons. It is figured that the total imports for the month will reach 9000 tons, so that practically a little over 3000 tons represents the net exports. The London market is cabled £52 6s. 3d. for spot and £52 8s. 9d. for futures. Best Selected declined 5 shillings to £55 10s.

Pig Lead.—Is without change. The Smelting & Refining Company still quote 4.12½c. for spot Desilverized, f.o.b. New York, and 4.10c. for futures. In another column an official statement is printed regarding the absorption of other concerns by the National Lead Company. The London market is lower with £10 15s.

Spelter.—The manipulating influences in the West continue. The high nominal price testifies to the closeness with which the market is held. Spot is quoted here nominally at 5.50c. St. Louis quotes at 5.30c. London is unchanged at £19.

Antimony.—Is lower. Hallett's is quoted 7¾c. and Cookson's 9½c., while other brands have declined to 7¼c. to 7½c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and term of order. Smaller lots are quoted as high as 60c., according to quantity.

Quicksilver.—The market is quiet and unchanged, the ruling quotations being \$48 per flask of 76½ lbs., each in lots of 50 flasks or more. London is unchanged at £8 15s.

Tin Plates.—The market is dull and uninteresting, with an absence of any important buying. Prices are without change. The American Tin Plate Company are quoting for delivery up to December 1 on the basis of \$4.19 per box for Standard 100-lb. Cokes, f.o.b. New York, or \$4, f.o.b. Pittsburgh. The market at Swansea declined 1½ pence to 12 shillings 1½ pence.

The Lead Consolidation.—Regarding the new lead merger, to which we referred last week, President L. A. Cole of the National Lead Company made the following statement to a representative of *The Iron Age*. "Negotiations have been concluded by which the National Lead Company will acquire by purchase a large number of kindred concerns. The American Smelting & Refining Company and other important financial interests will be associated in the enlarged company. Details are now being formulated and will be announced when perfected." All other information regarding the project Mr. Cole withheld pending the announcement referred to. Any announcement made at this time regarding the various concerns to be included in the merger must be based on mere speculation.

Henry Phipps of the Carnegie Interests, who is now abroad, is expected in Pittsburgh in October. Mr. Phipps has a number of projects under way in Pittsburgh requiring his personal attention, and among these is a large play ground and play house which he is erecting in the First Ward in Allegheny, which was the scene of Mr. Phipps' birth.

The New York Machinery Market.

NEW YORK, October 1, 1902.

September closed with a grand stand play of business. So brisk has the demand for machinery been for the last half month that the slight lull of the early portion of September was completely eclipsed. In the summing up the last month stands in a favorable light in comparison with the recent busy months. In the machine tool trade the demand has been particularly good. The number of unusually large purchases of tools continues to multiply, and the excellent demand for small lots is keeping up. Almost the entire list of machine tools for which the Baldwin Locomotive Works were in the market last week, and to which reference was made in this column, has been purchased. While New York merchants went off with a goodly share of the orders the bulk of them were placed with Philadelphia concerns. One notable item on the list included some 32 planers, some of them of good size. Half of them went to a prominent New York machinery house. The purchases consisted largely in the duplication of tools already installed in the Philadelphia works. The new tools are for the filling out of the various departments of the Philadelphia works, and as the foremen of the various departments stipulated the tools they desired they also specified the make which they were accustomed to using. An idea of the interest that was taken in this proposition may be found from the fact that the purchases aggregated upward of \$200,000 in value.

It is expected that a good sized lot of machine tools will be purchased by the Pennsylvania Railroad for the new shops which it has been decided to build at Altoona, Pa. While no direct information has been given out by the company as yet as to this project several wide awake local machine tool merchants have opened negotiations with the railroad, with a view of obtaining the list as soon as it is issued. One prominent concern have an agent at Altoona who is on the alert for information. W. W. Atterbury, general superintendent of motive power, whose office is at Altoona, will be in charge of the proposed extension. It was stated in some quarters that the list of machine tools has already been issued, and that it amounts to almost \$100,000. Other members of the trade who have followed the matter closely have not been able to obtain the list as yet.

Another large railroad deal is now up. The Baltimore & Ohio we are informed have just issued a list of machine tools to be purchased, amounting to about \$60,000. The tools are of medium and heavy types.

The general impression in the trade is that this list is but a forerunner of much heavier purchases. This view is supported by what we have been able to learn from the railroad authorities. The machinery is for installation at New Castle Junction, Pa., where the company have let contracts for new car repair shops, having a capacity of 100 cars a day. The chief engineer of the road at Baltimore advises us that the improvements are to cost \$600,000.

Recent orders for water tube boilers which the Babcock & Wilcox Company have received from railroads furnish some indication of the extent of improvements being made at their shops by the various roads. Last week we mentioned the large order for the meadow shops of the Pennsylvania. For their Milwaukee shop the Chicago, Milwaukee & St. Paul have ordered four 200 horse-power boilers. The Pittsburgh, Lake Erie & Western, who are erecting monster shops at McKee's Rocks, Pa., have ordered 1500 horse-power. The Chicago & Great Western will add 300 horse-power and the Louisville & Nashville just ordered 600 horse-power for their Decatur, Ala., shops.

The Betts Machine Company of Wilmington, Del., are about to make important improvements at their plant. The demand for heavy machine tools has been so heavy that they are to build a large addition to enable them to better cope with the business. A new erecting shop 40 feet wide by 240 feet long will be built. It will be equipped with a 20-ton electric traveling crane and suitable machine tools.

We have received further information regarding the new machine shops which are to be located at Beverly, Mass., by the United Shoe Machinery Company of Boston. In April, 1901, the directors voted to proceed with this work. A committee of three of the company's engineers made a tour of investigation, visiting plants which had been built in the last decade, which they thought would assist them in designing and laying out a model, up to date plant. Some 40 or 45 sites were visited, and all but three were finally eliminated. These were more carefully investigated; and, finally, the Executive Committee voted to accept the offer made by the City of Beverly. The company have now organized to carry along this work expeditiously, and have appointed F. M. Andrews of Dayton, Ohio, architect; Dean & Main of Boston, consulting mechanical engineers, and a building committee, in whose charge all the details of the new plant have been placed. Industrial and underground railways will connect the various buildings, and the whole plant will probably be electrically driven. In its four principal factories, including the cutter department at South Boston, the company are employing about 1900 men. It is

probable that when the new plant is started it will require at least 2000 hands. The company are now manufacturing 175 different machines, varying in weight from 6 to 4000 pounds, these machines being sent all over the country as well as to England, France, Germany, Switzerland, Italy, Spain, Russia, Turkey, Asia Minor, India, Japan, Australia, as well as many of the South American countries and the West Indies. It is estimated that the new plant will cost in the vicinity of \$750,000.

A number of machine tools are included in the list of supplies for the League Island Navy Yard, bids for which were opened yesterday. The list includes: One hand crane, two universal turret lathes, two spindle drilling machines, one foundry cupola, three blowers, one electric traveling crane, one metal planer, two plain milling machines, one 38-inch lathe, one 12-inch lathe, one 16-inch single geared crank shaper, one 26-inch triple geared rack shaper, one 5-foot arm radial drill, one set plate bending rolls, one single punch or shear, two 13-inch speed lathes, one horizontal boring and drilling machine, one 12-inch slotter, one 24-inch lathe, one wet grinding machine, one Fox lathe, one 37-inch boring mill, two 20-inch drills, two 16-inch engine lathes, two 18-inch engine lathes.

Plans are now being prepared for the new shops which the A. B. See Company of 220 Broadway are to erect at Jersey City for the extension of their elevator business. There will be three buildings, the principal one measuring 200 x 350 feet.

We are advised on good authority that the New Process Raw Hide Company of Syracuse, N. Y., intend equipping a factory at Newcastle-on-Tyne, England, for the production of their raw hide gears and pinions.

The Crocker-Wheeler Company, Ampere, N. J., are building an extensive addition to their works. It is intended to remove all light machinery to the new building, so as to provide room for the installation of larger and heavier machine tools in the main shop.

Engine builders have been following up a good order to be placed by a new concern, who are to erect a large cement plant at Martin's Creek, N. J. Joseph H. Wallace of 5 Beekman street is in the market for mechanical equipment for two large paper mills. For the new plant of the Munising Paper Company of Munising, Mich., the entire equipment, including paper making machinery, engines, boilers, pumps, &c., is still to be purchased. For the new plant of the Kalamazoo Paper Company of Kalamazoo, Mich., a large portion of the equipment is still open. Nordberg engines and Wickes boilers have been closed out.

William Kehoe, the senior member of the firm of William Kehoe & Sons, Savannah, Ga., has returned home from a visit to several cities, where he went to examine the latest improved machinery for large machine and boiler shops. His trip included Newport News, Baltimore, Wilmington, Del., Philadelphia, New York and Bridgeport, Conn., where he had the opportunity of inspecting all the latest things in his line of business. New machine and boiler shops which the company are building are nearing completion. The main building is 52½ x 165 feet, and is being erected by the American Bridge Company of New York. Kehoe & Sons are building the blacksmith shop themselves; this building will be 35 x 60 feet. They are also doing the brick work, of which, however, there is very little. The structure is of iron and glass and is storm and fire proof. It is one-story high and in the center 35 feet from the floor. It is provided with a traveling crane having a swing of 20 feet and running the entire length of shop. These shops will be equipped with the latest and most improved tools, including Reed lathes, Betts boring and turning mills, Brown & Sharpe milling machines and Carey Machine & Tool Company's machine tools. The boiler shop will be fitted up with Hilles & Jones tools and the blacksmith shop with the latest steam hammer and appliances. It is the purpose of Kehoe & Sons to have this new addition to their present shops equal to the best establishment on the Gulf and Atlantic Coast, and able to handle quickly and economically every class of work done in a modern foundry, machine, blacksmith and boiler shop.

The new slag cement plant of the Stewart Iron Works, Sharon, Pa., will be placed in operation on October 15 next. The plant is to have a capacity of 500 barrels in ten hours. It was installed by the Ruggles-Coles Engineering Company, 39-41 Cortlandt street, New York. The process to be employed was described in *The Iron Age* under the date of July 17, 1902, and was invented by C. J. Curtin of 39-41 Cortlandt street, New York.

The Empire Iron & Steel Company.—We are advised by the Empire Iron & Steel Company, Niles, Ohio, that the report that they will not manufacture iron and steel sheets, but only angles, is incorrect. They have installed a plant of six hot mills for the manufacture of sheets of No. 14 to No. 30 and this plant will be started within the next two weeks. They will also roll light angles in addition to their other work.

The Chicago Machinery Market.

CHICAGO, ILL., September 27, 1902.

The machinery business in the Northwest continues to be run at high pressure. Without exception reports received from the principal manufacturers indicate that the works are well supplied with orders which will carry the present activity well into the winter, and in some cases, notably manufacturers of certain lines of engines, orders have already been secured which insure work at full capacity for the next ten months or even longer. New buildings and new equipment are being continually added to enable manufacturers to keep pace with the new contracts. In the line of power transmission machinery it is noted that buyers are more inclined to specify apparatus more nearly conforming to standard designs, as through this means they are doubtless able to obtain quicker deliveries. In the demand for cranes it has been observed that while the average capacity per crane is somewhat less than during the preceding months it is attributed to a more general demand which indicates activity in the smaller industrial works as well as in the largest factories. Orders for cement mills, cotton seed mills and grain elevator machinery have continued very satisfactory.

It is worthy of note that some manufacturers of gas and gasoline engines report that during the month of September they again broke all records in their commercial history. The outlook for foreign trade in this line is considered unusually bright and is constantly improving. One point which is probably the outgrowth of the stringent fuel conditions experienced throughout the United States recently is that various plants are making preparations to use crude oil for fuel, especially for use in forges for heating and other purposes wherever it is available. It is possible that this introduction may lead to the more general adoption of oil as fuel, but of course everything depends upon the economical distribution and use of the oil. Among the most active influences, as reflected in the demand for engines, boilers and pumps, are the railroads who are supplying themselves with new and improved apparatus and tools which greatly facilitate work in their shops as well as repairs on bridges and in new construction. Several important plants which have been running overtime for months will probably maintain this activity for several months longer.

Manufacturers of machine tools continue to experience an urgent demand for their output, especially for heavy tools, and although business at the present time as compared with previous years is greater than ever before indications do not point to any early falling off. Several manufacturers refer with interest to the desirable specifications which they are receiving for machinery for export. Agents and dealers as well as manufacturers continue to report that business is larger in volume than during any preceding month, and this is reflected in the demand for material of all sorts that enters into machinery. Some dealers note that while nearly every line is represented in the demand for machine tools agricultural implement manufacturers are most prominent, many of whom seem to be behind in contracts for next year's business and are ordering additional machines to help out during the busy season.

Some manufacturers of special machinery note that they have had a better volume of business during the last quarter of the year than ever before during a like period, and on some lines capacity is sold ahead for six months, while other manufacturers are unwilling to accept orders for anything less than 10 to 12 months' delivery. Even manufacturers who have noted a slight tendency toward a falling off in orders now report the closing of business of importance during the last week or ten days, which will compel them to continue to work overtime through the winter.

While it is notable that the distribution of pneumatic and smaller tools, supplies and general equipment is of a general nature covering the entire country, some manufacturers advise that they note a large proportionate increase in the demand from the West, especially the Mississippi Valley, in the territory between Pittsburgh and Kansas City. There is still more or less complaint of the difficulty in obtaining necessary material with any degree of promptness. Generally speaking, both manufacturers and dealers have larger, more desirable and a greater number of orders for various supplies on hand than ever before, and while domestic business continues at the maximum it is notable that there is a broadening of the demand which embraces many of the most important foreign countries. As a rule collections are reported very satisfactory.

Power and Transmission Machinery.

Stephens-Adamson Mfg. Company, Aurora, Ill., say that they are very busy on orders for cement mills, cotton seed oil mills, grain elevator machinery and general power transmission outfits for factory equipment. The company are making an addition to their plant in the construction of a brick office building, 30 x 42 feet, two stories high. When this building is completed they will move their office into it from the machine shop, thus giving increased space in the shop and allowing the contemplated installation of additional machinery.

The Industrial Works, Bay City, Mich., report that business in their line of manufacture has been fully up to capacity, and from inquiries now received they expect to be filled for the next four to six months.

Pawling & Harnischfeger, Milwaukee, Wis., advise that the demand for electric cranes and hoists remains very satisfactory. They state that buyers are more inclined to specify hoisting apparatus better conforming to standard designs. While the average capacity per crane appears somewhat less, yet the company consider this accounted for through a much more general demand. They quote recent sales as follows: Davenport Foundry & Machine Company, Davenport, Iowa, one 5-ton crane; Alan Wood Iron & Steel Company, Conschockocken, Pa., one 15-ton crane; Smeeth Copper & Bronze Company, Chicago, one 10-ton crane; Copper Queen Consolidated Mining Company, Bisbee, Ariz., three 10-ton cranes; American Sheet Steel Company, Cambridge, Ohio, one 30-ton crane, with 5-ton auxiliary hoist; International Harvester Company, Deering Division, Chicago, two special 5-ton hoists; Vulcan Crucible Steel Company, Aliquippa, Pa., one 15-ton crane, with 3-ton auxiliary hoist; American Sheet Steel Company, McKeesport, Pa., one 30-ton crane, with 5-ton auxiliary hoist, and one 10-ton crane; Greenslade Foundry Company, Milwaukee, Wis., one 15-ton crane; American Foundry & Construction Company, Pittsburgh, Pa., one 3-ton crane; Reading Iron Company, Reading, Pa., one 10-ton crane; Canonsburg Steel & Iron Works, Canonsburg, Pa., one 25-ton crane, with 5-ton auxiliary hoist; Holthoff Machinery Company, Cudahy, Wis., one 3-ton hoist; Allis-Chalmers Company, Milwaukee, Wis., for sanitary district of Chicago, one 15-ton crane; McConway & Torley Company, Pittsburgh, Pa., one 2-ton crane; Brown-Corliss Engine Company, Corliss, Wis., one 30-ton crane, with 5-ton auxiliary hoist; Gisholt Machine Company, Madison, Wis., one 10-ton crane; Milwaukee Electric Railway & Light Company, Milwaukee, Wis., one 5-ton special hoist; Standard Steel Works, Burnham, Pa., one 10-ton crane; Christensen Engineering Company, Milwaukee, Wis., two 10-ton cranes; Hanson & Tunelius, Chicago, one 1½-ton hoist crane; Sterritt-Thomas Foundry Company, Pittsburgh, Pa., one 10-ton crane; Elyria Iron & Steel Company, Elyria, Ohio, one 15-ton crane.

Engines, Boilers and Pumps.

The Union Steam Pump Company, Battle Creek, Mich., say that their business has been quite satisfactory, being one-third greater than last year.

The Weber Gas & Gasoline Engine Company, Kansas City, state that the condition of business was never better in their history than it is at present. Their last month's business broke all previous records. They consider the outlook for the future very good, every condition existing to make business good in nearly all of the States. They anticipate, of course, some few exceptions; for instance, in States where there has been excessive rainfall. They consider the prospects very good for business in foreign countries, their trade in that direction constantly improving. The increase of business has compelled the company to enlarge facilities by putting up four new buildings and adding new tools. They are now equipping their plant with crude oil for fuel, forging, heating and other purposes.

The Nordberg Mfg. Company, Milwaukee, report that the pressure of new orders offering continues, and to such an extent that they are seriously considering the immediate enlargement of their machine shop to nearly double its present capacity. They are unwilling to accept new orders on anything less than 10 to 12 months' delivery, but for the accommodation of old customers have booked some orders for a less period.

The Otto Gas Engine Works, Chicago, report that orders indicate a full measure of business in the general machinery world. They received orders during the past month for several engines ranging from 20 to 100 horse-power from the Union Pacific for hoisting coal, ties, &c., and also from the Santa Fé for a number of coal hoisting engines. They recently fitted out two pneumatic tool cars for railroad companies for bridge repairing purposes. The company report that general orders for water stations are coming briskly as is usual at this season of the year.

The Quincy Engine Works, Quincy, Ill., state that they have every reason to be pleased with the present condition of business and the prospects for the future. They have been running their plant overtime for several months, and will continue to do so for some time. They expect to ship in a few days to the Indianapolis Light & Power Company a 26 x 42 inch Williams vertical cross compound engine, designed to drive a 1200-kw. direct connected General electric generator. They also have other important orders for engines of this type to be completed within the next six months. The company's foundry, which has a capacity in excess of their present needs, has of late been furnishing heavy and medium gray iron and semisteel castings to the trade, and the outlook for business in this line is good.

The Witte Iron Works Company, Kansas City, state that their business as compared with former years shows a large increase in volume. Notwithstanding that they have added considerable to their equipment in the last year they

find themselves still unable to accumulate any stock. They anticipate a large increase in the volume of future business, and believe that conditions will remain favorable for some time to come.

Machine Tools.

The Geo. Whiting Company, Chicago, report that they are still feeling the prosperity wave which is floating over the country, and furthermore have found it necessary to continually add to their equipment in order to keep up with the demand. One of the most favorable omens that they noticed during the past month was the receipt of several inquiries from foreign concerns who desire to handle their machines. They recently manufactured for the Atlas Engine Works, Indianapolis, Ind., a belt power riveter with some special improvements thereon for the purpose of building smoke stacks, tanks, piping or other iron work of such description. They report that payments are very prompt. From present indications the company expect a large future demand for the line of goods which they manufacture.

Joseph T. Ryerson & Son, Chicago, state that the inquiries for and sales of machinery continue to be abnormal. The demand for heavy tools particularly is increasing, and they are receiving specifications for export which are very interesting. They believe that the volume of business is far in excess of what it has ever been before.

The Scully Steel & Iron Company, Chicago, report that business during the past month was the greatest in their experience. Inquiries are being received from all over the world, and everything seems to indicate an enormous demand, especially for plates and structural material. The company have lately been appointed the general selling agents of the Baird Portable Machine Company of Topeka, Kan., for the entire United States, and are flooded with inquiries for their line. They are also taking orders in every section for heavy machinery, such as boiler punches, Wangler rotary bevelers, rotary splitting shears, &c. They furnish the following list of orders taken for heavy machinery during the month of September: Des Moines Bridge & Iron Company, Des Moines, Iowa; Terre Haute Boiler Works, Terre Haute, Ind.; Union Iron Works, Seattle, Wash.; Illinois Steel Company, Joliet, Ill.; Collingwood Ship-Building Company, Collingwood, Ont.; Pass City Foundry Company, El Paso, Texas; Skobis Bros., Milwaukee, Wis.; Superior Machine & Boiler Works, Chicago; Rarig Engineering Company, Rarigville, Ohio; Drake, Williams, Mount Company, Omaha, Neb.; Phillips & Buttorf Mfg. Company, Nashville, Tenn.; P. J. Connelly, Knoxville, Tenn.; Sutherland & Kelly, Troy, N. Y.; Kennicott Water Softener Company, Chicago; United States Navy Yard, League Island, Pa.; Mexican Petroleum Company, Tampico, Mexico; J. A. Pement, Chicago; Milwaukee Steel Structural Company, Milwaukee, Wis.; Lowell Wind Mill & Mfg. Company, Salina, Kan.; Hamler Boiler & Tank Company, Chicago; Stillwell-Bierce & Smith-Valle Company, Dayton, Ohio.

The Hill Tool Company, Anderson, Ind., say that their business at present is extremely good, both foreign and domestic, and they have prospects of a still greater business.

The Anderson Tool Company, Anderson, Ind., state that they have more orders on hand for their electrically driven Universal grinders than they have ever had at any one time before, among the orders being a shipment for Paris. They report collections very satisfactory. The majority of their orders for home consumption are for shipments South.

The Hoefler Mfg. Company, Freeport, Ill., continue as busy as ever, with every indication of a like condition of business for some time to come.

McDowell, Stocker & Co., Chicago, state that their business for the past month has been very satisfactory. They have taken a few good sized orders, but the most of their trade has been from concerns ordering from one to four machines to help out during the busy season. They report inquiries for machinery also very satisfactory and the outlook for the immediate future very promising. They experience the greatest activity at present among manufacturers of agricultural implements who seem to be away behind on their contracts for next year's business.

Special Machinery.

The Vilter Mfg. Company, Milwaukee, state that a short time ago the tendency seemed to be toward a falling off in orders, but orders have increased and they have closed for considerable new business within the past week or ten days. Their works are still continued in operation day and night, and from present indications they anticipate a good volume of business through the winter. Their orders are mainly for home consumption, very little export business having been transacted for several months.

Williams, White & Co., Moline, Ill., say they find themselves pressed just as hard as ever to get out orders, and see no slackening of the demand. Their new machine shop building is nearly completed, and makes a very fine appearance. They are also putting in some additional tools. The company believe that the volume of business has been greater this year on an average than during any previous year that they have done business, although the latter half

of last year was also a very busy one. They find orders almost equally good in all lines—bulldozers, punches and shears, eye benders, power hammers, drop hammers, &c.

The Novelty Iron Works, Dubuque, Iowa, state that orders have been slacking up somewhat during the last few weeks, but they expect a greater volume of business during the last quarter of the year than they have ever experienced before. They will add new machinery and make every effort to get a stock of Boss power hammers ahead, which has been an impossibility for the last six months. They report the volume of business during 1902 the largest they have ever experienced.

The Barnard & Leas Mfg. Company, Moline, Ill., say that business is very good. They are selling a number of their magnetic separators, but their principal trade is in flour mill and elevator machinery, and along these lines they were never busier. They report prospects bright for future business.

Equipment, Supplies and Tools.

The Chicago Pneumatic Tool Company, Chicago, report that their air compressor plant at Franklin, Pa., is operating day and night. Among recent sales of importance which they have made are two large compound compressors for the New York Central & Hudson River Railroad Company's Jersey shore shops; two large compressors for the Readville shops of the New York, New Haven & Hartford Railroad Company; a compound compressor of 2000 cubic feet capacity per minute for the Lake Shore & Michigan Southern's Collinwood shops, being a duplicate of the first compressor installed; a 1000-foot compound compressor for the St. Louis, Iron Mountain & Southern Railroad, and one of the same capacity for the new shops of the Big Four Railway; a Government order for the installation of a 1000-foot compound compressor at the Norfolk Navy Yard; five large size straight line compressors to the American Lime & Stone Company, Tyrone, Pa.; a 1000-foot compound compressor to the Mobile & Ohio Railroad for their shops at Mobile, Ala., and one of 500 cubic feet capacity to the Louisville & Nashville Railroad.

The Whiting Foundry Equipment Company, Harvey, Ill., state that the volume of business continues at the top, inquiries for new work being freely received, making prospects encouraging for future business.

The D. Clint Prescott Company, Menominee, Mich., state that they have greater difficulty in obtaining material than they have in getting rid of it. They have all the business they can possibly attend to and a little more. They are planning to double the capacity of their foundry.

The Bignall & Keeler Mfg. Company, Edwardsville, Ill., report that their business is exceedingly prosperous and bids fair to continue so during the coming winter at least. Inquiries are good and the proportion of sales to inquiries is unusually large. Their business is naturally large in the West, but during the last few years it has been confined principally to the Mississippi Valley, that is the territory between Pittsburgh and Kansas City. They find that there is a large increase of business from the West, and believe it will increase to a very marked proportion. The company report a remarkable increase in business over previous years, the amount done during the year 1902 being more than double that of the year 1900. In order to be able to meet any further inquiries they are now preparing plans for some additions to their shop.

The Reeves Pulley Company, Columbus, Ind., report general business conditions good, both present and prospective, their only complaint being that they are unable to secure materials with any reasonable degree of promptness. Their foreign business outside of Europe is very good. The company contemplate several additions to their plant this fall in the way of foundry, new dry kilns, additional boiler capacity and heating plant.

Boston Machinery Market.

BOSTON, MASS., September 27, 1902.

Quiet, but not stagnant, is the state of the machinery and machine tool market in this vicinity. The difficulty experienced in getting orders promptly filled by the factories and the consequent impossibility of promising deliveries on definite dates still continue to be detriments to business, although complaints are not so strong as they were two months ago. This is apparently due to a decrease in demand for quick deliveries rather than to any improvement in that direction on the part of manufacturers. Some dealers are beginning to feel somewhat apprehensive about the probable shortage of coal, owing to its effect upon manufacturers, and they are hoping for a speedy settlement of the labor troubles in the coal regions. There is also some comment upon the advance in the price of iron and steel, but it is not yet mentioned as a factor in the situation. Altogether the existing conditions seem to be favorably regarded.

The Stilwell-Bierce & Smith-Vaile Company have just installed and got into successful operation the equipment

for the Groton Water Company of Groton, Conn. The equipment includes two triplex power pumps of 750,000 gallons capacity, two horizontal Victor wheels and a 72 horsepower Westinghouse gasoline engine.

The town of Peabody, Mass., is to install a new pumping station.

The United Shoe Machinery Company have decided to combine all their plants in one at Beverly, Mass. They have secured 150 acres of land in that city, and will erect a plant costing \$500,000. At present the company are operating plants in Beverly, Winchester, Mass., and Boston. The Salem, Mass., Board of Trade obtained options on land in that city in the hope of inducing the company to build there, but the latter decided that Beverly was better suited for their needs.

The United States Steel Company's (Everett, Mass.) directors have elected the following officers: President and treasurer, Charles S. Miller; vice-president, H. B. Whall.

The Enfield Electric Light & Power Company are planning to enlarge their plant at Enfield, Mass. The company propose to add a 250 horse-power engine and boilers to their present equipment.

The Old Colony Street Railway Company are building a new power house at Newport, R. I.

The American Tool & Machine Company are making good progress on the addition to their Hyde Park, Mass., plant. They expect to have it completed and everything in satisfactory running order by November 1.

The Rhode Island Company, who control the electric railways of Providence and Pawtucket, R. I., are to double the boiler capacity of their new power house in the former city. The company intend to have the engines develop 24,000 horse-power. The boilers are to be fired by mechanical stokers to prevent black smoke, in obedience to the anti-smoke law, which takes effect in that State on January 1, 1903. The Narragansett Electric Lighting Company are also equipping their Providence plant with smoke preventing devices.

Atwood & McManus are about to build a new box factory in Chelsea, Mass.

Naval Constructor William J. Baxter, head of the Department of Construction and Repair at the Charlestown Navy Yard, has written the Navy Department, recommending the filling in of a part of the tidewater space at the eastern end of the yard for a site for a lifting dock and storage sheds for torpedo boats and torpedo boat destroyers. It has also been suggested that the present dry docks be lengthened 30 feet so that larger ships could be repaired at the Navy Yard. Mr. Baxter has also recommended the building of a floating machine shop to be used in repairing vessels at wharves or at anchor. He suggests a scow, 24 x 48 feet, built strong enough to support a great weight, on which shall be placed a machine shop, 20 x 36 feet, and a large derrick. The shop is to be equipped with a complete repairing outfit, the tools to be operated by electricity, the shop to contain the electric plant. Such a shop would prove very valuable in time of war.

Three shifts of men are employed at the Navy Yard seven days per week making repairs on eight warships, the largest number ever undergoing repairs there at one time. Four new Babcock & Wilcox boilers have been installed on the monitor "Amphitrite."

The Philadelphia Machinery Market.

PHILADELPHIA, PA., September 27, 1902.

A marked increase in transactions is to be noted in the Philadelphia machinery market during the past month. Besides some large specifications, such as the requirements of the Baldwin Locomotive Works in this city, aggregating several hundred thousand dollars' worth of tools for the equipment of their various improvements, and the equipment of the new plant of the Fourimer-Searchmont Automobile Company, at Chester, Pa., there has been a good day-to-day demand, which confirms the opinion that there will be no decrease in the activity of the machinery trade for some time to come. Inquiries on most lines have improved, and are said to be leading up to actual orders without much delay. The demand does not appear to follow any particular lines, but covers the general run of tools; orders for large and special tools, however, are placed with more promptitude than is the case with the smaller and medium sized standard goods.

There is practically no change in deliveries. In the smaller and standard tools good deliveries can be obtained, as a considerable stock is on some manufacturers' and dealers' floors. With the larger tools and those of special design, however, deliveries are distant, most manufacturers having their capacities contracted for well into the coming year, and scarcely anything can be promised for this year's delivery.

The strike of the anthracite miners continues to have a more or less disturbing effect on the trade and no definite signs of settlement are apparent. Some anthracite is being mined, and a number of washeries are being operated, but little coal is coming into the open market. Bituminous coal

has again advanced in price and is becoming more scarce, due no doubt to inefficient transportation facilities of the various railway.

Foreign demand has in some few lines improved, but the export trade in general shows no increase in activity. There is practically nothing being done for export at present in the way of machine tools.

The local shipyards continue extremely busy and are all operating to their fullest capacity. Contracts for some large vessels have recently been signed, and the work ahead is sufficient to insure continued activity for a long time.

There is no diminution in the amount of work being taken by the various iron and steel foundries. Deliveries of iron castings have in some cases improved, but are still far from being as prompt as manufacturers desire. The scarcity of pig iron and fuel continues to be felt, although foreign iron has helped out to a great extent, while coke, although itself scarce, has practically replaced anthracite in the cupola.

There has been a very active demand for boilers and engines, and manufacturers in these lines are correspondingly busy, while deliveries are more or less in arrears. The demand for machine shop supplies continues heavy, and, although satisfactory deliveries are hard to get, the volume of business is quite large.

Prices generally are on a higher level and are being well maintained, but this appears to have no effect on the placing of orders, and most purchasers are willing to pay a premium for prompt deliveries.

The Franklin Machine Works, Incorporated, Philadelphia, Pa., have recently arranged with the Garvin Machine Company, New York, for the sale of the Franklin horizontal tool room boring machine in New York City and vicinity. The Franklin Machine Works recently booked orders for a large number of their various tools, and all departments are being operated to their full capacity. Recent deliveries of a large milling machine for an Eastern wood working machinery company and a tool room boring machine for Western parties are to be noted.

The Espen Lucas Machine Works are operating their plant on extra time to make deliveries on orders for their new cold saws. Inquiries are said to be of a most satisfactory nature, and a large number of shipments of cold saws of various sizes to local and out of town parties are reported.

The Philadelphia Pneumatic Tool Company broke all previous records in the month of August in the amount of goods shipped, and from present indications September will establish a new high record in that respect. Large orders have recently been received from the Cambria Steel Company, New York Shipbuilding Company, Newport News Shipbuilding & Dry Dock Company, International Steam Pump Company and the Grand Trunk Railway Company. Foreign orders have also been received from Paris, London and Copenhagen. More orders for rotary drills have been received during the past two months than ever before. This company have just added a number of new tools to their equipment, and are running all departments at their best capacity.

The Southwark Foundry & Machine Company are building a number of large Weiss condensers, several of which will have a condensing capacity of 5000, 6000 and 10,000 horse-power. Orders for blowing engines and other heavy machinery have recently been booked, and work is on hand sufficient to keep the plant running at its full capacity for some time to come.

The Royersford Foundry & Machine Company, Royersford, Pa., advise us that the punch and shear business is very active, and that all departments of their plant are running full, with plenty of orders and inquiries coming in daily. Recent shipments of punch and shearing machines include six combined machines for Marshall & Husehart Machinery Company, who represent them in Ohio, Michigan, Wisconsin, Indiana and Iowa; one No. 3A machine to the Bethlehem Steel Company, South Bethlehem, Pa.; one No. 3 combined machine for Cooper & Wigand, New York; one No. 3 for the Quintard Iron Works, New York; one No. 3 single shear to the Pittsburgh Valve, Foundry & Construction Company (from which parties a second order has just been entered); one No. 1 combined for E. Strauss, Rosebud, Texas, and one No. 2 single end shear to Cornelius Vanderbilt, at Buffalo, N. Y.

The American Pulley Company, Philadelphia, note an increase in the foreign demand for their product during the past month; also a marked improvement in the domestic trade. Shipments of large quantities of pulleys for export to New Zealand, Australia, London and Birmingham, England, have been made, while the heaviest local deliveries have been made to St. Louis, Mo.; Portland, Ore., and San Francisco, Cal. Inquiries for next year's delivery are being received, and a number of orders for that account have already been booked.

Dienelt & Eisenhardt, Philadelphia, are very busy, particularly in the foundry, which is being operated at the fullest capacity. Orders for dead stroke hammers and for jacks have been very numerous and the departments in order to keep up with deliveries, which are being made to

many local and other parties. A number of oilcloth printing machines for export are also in course of construction.

The Philadelphia Steel & Iron Company, who recently absorbed the Ferro-Carbon Casting Company, have let the contract for a new 12-ton melting furnace, and contemplate further additions and improvements to their plant in the near future.

The Falkenau-Sinclair Machine Company, Philadelphia, advise us that business conditions for the fall and winter are good. Inquiries continue numerous, and orders have been booked among others for a 500-ton straight sided press with steel housings for embossing and cold forging; a 150-ton chain testing machine for the Hayden-Corbett Chain Company, Columbus, Ohio, and a 20,000-pound vertical screw testing machine for scientific purposes for the Pardee University. A vertical screw power testing machine of 100 tons' capacity and a special specimen milling machine are building for the Cambria Steel Company. Recent deliveries include a spacing punch 40 feet long for punching angles, for local parties, and a number of special milling machines. A number of presses have also been shipped, and the final deliveries have been made of the governors for the Niagara Power Company, Niagara Falls, N. Y.

The Hess Machine Company, Philadelphia, report a good volume of trade. Inquiries have been numerous, and conditions for the fall trade are satisfactory. Two sets of file making machines have recently been shipped to England, and another set will be delivered early in the month, as will also several sets of machines building for export to Germany. A number of file machines and some special tools are also in course of construction for the domestic market.

Alfred Box & Co., manufacturers of electric cranes, hoists, &c., Philadelphia, are busy in all departments. Inquiries of a very satisfactory nature are being received and a number of orders are being booked, among which may be mentioned a 5-ton, 60-foot span, three-motor electric traveling crane for the Tidewater Steel Company, Chester, Pa.; two 5-ton hand traveling cranes for the Kensington avenue shops, and a 5-ton, 70-foot span, three-motor electric traveling crane for the Sutherland avenue shops of the Philadelphia Rapid Transit Company; a 5-ton, three-motor, 40-foot span electric traveling crane for Wickwire Bros., Portland, N. Y.; a 30-ton trolley equipment for the Seaboard Steel Casting Company, Chester, Pa., and a 7½ and a 17 ton hand power traveling crane for the Union Railway Company, New York City. Recent deliveries of various styles of cranes have also been numerous, and include a double 5-ton electric trolley equipment for the Guerber Engineering Company, Bethlehem, Pa.; a 6-ton two-motor and a 15-ton three-motor electric traveling crane for the Newton Machine Tool Company of this city; an 8-ton three-motor traveling crane for the new foundry of the Cresswell-Waters Company of this city; a 5-ton hand power jib crane for the Watts-Campbell Company, Newark, N. J.; a 5-ton hammer jib crane for the Tioga Forge & Iron Company, Philadelphia; two hand power jib cranes for Henry Disston & Sons, Incorporated, and a 5-ton hand power traveling crane for the Roxborough Pumping Station, Department of Public Works, Philadelphia.

The Tabor Mfg. Company, Philadelphia, have booked orders during the past month for a number of molding machines, the domestic demand being for the larger sizes, such as 26 x 44, 30 x 30 and 30 x 48 inches, while those received from foreign sources have been for the smaller machines. Orders for three large split pattern vibrator frame machines for Pennsylvania delivery and four of the same type for Southern territory are noted. The first power ramming element of the large triple molding machine, building for the Bethlehem Steel Company, South Bethlehem, Pa., is ready for shipment. This element weighs 25,000 pounds, and the distance between the strain rods is 9 feet in the clear. Another element of the same size and the special pattern handling machine for the same mill will be ready for shipment at an early date. This particular machine will be used by the Bethlehem people for the molds for the gray iron cast sections of the Hudson River Tunnel. The Tabor Mfg. Company have also shipped to the Burlington & Missouri River Railroad Company, Plattsmouth, Neb., a 16½ x 21 inch machine, with wooden plate and patterns for journal bearing.

The Energy Elevator Company, Philadelphia, have had an active month. A large number of orders for various style of elevators have been booked and the fall trade is very promising. Recent deliveries include shipment of freight elevators to Cottonport, La.; Port Allegheny, Pa.; Rockhill, S. C.; Deadwood, S. D.; Hollandale, Miss., and Buffalo, N. Y. Dumb waiters have also been shipped to York, Pa., and Ithaca, N. Y., while conspicuous among the local business is a special scenic elevator equipment for B. F. Keith's new Philadelphia theater.

The Diamond Drill & Machine Company, Birdsboro, Pa., report their almost complete recovery from their recent fire. They expect to have their new steel plant as well as their new iron foundry in successful operation within the next two months. They have practically secured all the equipment and are rapidly filling orders. They are also building a large blacksmith shop, and are doubling the ca-

capacity of their electric light plant, also their boilers and engines.

There is no abatement in the activity of the Baldwin Locomotive Works, Philadelphia. Every department is being operated to the utmost capacity, and arrangements to increase that capacity are being continually made. A large power house is to be erected on the northeast corner of Sixteenth and Hamilton streets, and on the opposite side of Hamilton street, extending to Pennsylvania avenue, a new two-story flange and smith shop will replace the present buildings. The present hammer shop, located at Pennsylvania avenue and Fifteenth and Hamilton streets, will give way to a six-story brick and iron building, to be used as a machine shop. The removal of the hammers and furnaces is now under way. All the present buildings on the south side of Hamilton street west of Seventeenth street will be remodeled and become part of a large brick and iron structure, four stories high, which is to be erected on the site. In addition to these improvements a large engine house and finishing shop will be erected, capable of holding 35 finished locomotives. This building will be about 400 feet long. Specifications for 52 of the 250 engines ordered by the Pennsylvania Railroad Company have been received, and work on them will be started at an early date. Orders for other engines are also being booked, and inquiries are said to be very satisfactory. Shipments of locomotives are being made daily, and include deliveries to the Pennsylvania Railroad, Atchinson, Topeka & Santa Fé Railroad, Lehigh Valley Railroad, Philadelphia & Reading Railway, Denver & Rio Grande Railroad, and a number of other railways and individual parties.

Iron and Industrial Stocks.

The past week has given holders of industrial, as well as railroad stocks, a succession of sensations. Early last week a decided stringency in the money market was experienced, which caused a sharp decline on the Stock Exchange. Some relief was afforded at once by the Treasury Department anticipating interest on bonds, to which the stock market immediately responded, regaining almost all of the decline. But on Monday of the present week another and worse slump was precipitated by the banks again calling in loans. As high as 35 per cent. was paid for money and a semi-panic developed. Confidence was restored by the announcement that the Secretary of the Treasury had decided no longer to require banks to maintain 25 per cent. reserve on deposits of Government money already secured by Government bonds, or by other bonds of approved standing, and an improvement in prices took place on Tuesday. The decline in industrials was at no time as severe as in some of the railroad stocks. The Virginia Iron, Coal & Coke Company's stock and bonds continue conspicuously strong.

The annual meeting of the stockholders of the Republic Iron & Steel Company will be held at 15 Exchange place, Jersey City, N. J., on Wednesday, October 15, for the election of directors and for the transaction of other business.

The Manufacturers' Light & Heat Company of Pittsburgh recently exhausted the \$2,000,000 issued of their \$5,000,000 capital stock to absorb four competitors, and the stockholders will vote on November 24 on a proposition of an additional issue of \$5,000,000. Reports are that it is the intention of the Manufacturers' Light & Heat Company also to absorb the Fort Pitt Gas Company and the People's Natural Gas Company, both competitors in the natural gas business in Pittsburgh. Present shareholders will have the first call in the purchase of the new stock in proportion to their present holdings. The new stock, like that now issued, will all be common. The company have a bond issue of \$648,000, issued by the Manufacturers' Company when they purchased the People's Light & Heat Company of Washington, Pa. Besides the constituent concerns mentioned the Manufacturers' Company are made up of the Manufacturers' Bellevue and Glenfield natural gas companies, which have been liquidated in the reorganizations; the Canonsburg Light & Heat Company and the Waynesburg and Citizens' natural gas companies.

Dividends.—The Rhode Island Perkins Horse Shoe Company have declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable October 15.

The Westmoreland Coal Company have declared a semi-annual dividend of 3 per cent. and an extra dividend of 2 per cent., payable October 1.

At a meeting of the Board of Directors of the Chicago Pneumatic Tool Company, held last week, a quarterly dividend of 2 per cent. was declared, payable October 15. The capital stock of the company is \$10,000,000. Although the new company have been in existence only since January of this year three dividends of 2 per cent. each have been declared, and a handsome amount has been carried to surplus account.

The E. W. Bliss Company of Brooklyn have just paid a quarterly dividend of 2½ per cent. on the common stock and 2 per cent. on the preferred stock.

The directors of the Colt's Arms Company, Boston, have declared a dividend of 1 per cent. on the stock, payable October 11 to holders of record October 1, 1902.

HARDWARE.

THOSE who have watched the course of things in the trade have noticed as one of its prominent features during the last few years the fact, to which we have already alluded, that there is an increasing tendency toward the sale of Paints by Hardware merchants. So far has this gone that the Hardware trade are now recognized as an important channel through which this line of goods reaches the public. An illustration of this is given in the fact that many of the Hardware jobbers are now regularly selling Paints, and some of the manufacturers, recognizing the trend of things, are making efforts to establish relations with both wholesale and retail merchants. The discussion of the subject in our recent issues, in which we directed the attention of Hardware merchants to this line as one which in many communities can advantageously be added to their business, has evidently been regarded by the trade with interest and approval as a practical suggestion which may be acted upon by enterprising merchants. In this connection letters on the subject from Paint manufacturers, which are given on another page, will indicate how the matter is regarded from their point of view, while the extracts from the letters of wholesale Hardware houses will emphasize the fact that Paints and Oils find an appropriate place in the Hardware store. There is little doubt that through this class of merchants they will more and more find their way to the consumer. While circumstances in some places may make it inexpedient for Hardware merchants to take up this line, it is certainly the part of wisdom for the trade generally to consider the subject and to decide what course should be pursued in regard to it.

The point is often made that the jobbing trade are unwilling to take hold of a new article and introduce it to the retail merchants. For this acknowledged fact there is an obvious explanation, inasmuch as it would not pay a jobber under ordinary circumstances to go to the trouble and expense of introducing a novel article and particularly a specialty for which at first and perhaps ultimately there would be only a limited sale. On this account most manufacturers find it necessary to go direct to the trade, and in some cases to the public, to get a foothold in the market and establish something of a demand for their products. When this is accomplished they then find the jobbers willing to take up the sale and not only take care of such orders as come to them, but do their part in finding a larger market for the goods through their very efficient machinery for canvassing the smaller merchants. There is little doubt that, taking a broad view of the subject, jobbers frequently make a mistake in the policy which they pursue in this matter, and that more regard for the manufacturer's interests, shown in efforts to introduce his goods when they are unknown to the trade, would be appreciated and tend to make closer and more cordial relations between these two great classes. As it is, under the existing condition of things many close ties are formed between the manufacturers and the smaller dealers, who, becoming the manufacturers' earliest customers and at a time when their support is needed, are naturally taken care of even when the larger houses have taken up the sale of the goods.

While it is unquestionably true that the jobbing trade handle mainly articles for which there is an established demand they are entitled to credit as doing much to introduce Paints, and especially Mixed Paints, to the

Hardware trade. At the present time there is no doubt that a much larger proportion of the jobbers than of the retailers are selling this line, giving it representation in their catalogues and soliciting orders through their force of salesmen on the road. This line is, indeed, of enough importance, having sales of sufficient volume, to justify them in taking pains to find a market for it. Their course in this matter is indicative also of a tendency on their part to broaden their lines and handle classes of goods which formerly had but little place in the market and were thus without a regular channel for their distribution, or were handled by merchants in other fields in which they do not so naturally belong. There can be no question that the trade are indebted to the breadth of view of the wholesale houses in thus widening the Hardware field and making it more deserving of cultivation by enterprising merchants.

Condition of Trade.

One of the marked features of trade is the difficulty experienced in getting goods promptly from the manufacturers, many of whom are a month behind their orders. This necessitates much correspondence and where stocks in jobbers' hands are broken adds considerably to the trouble and annoyance of business. The demand varies greatly according to the character of trade and locality. Some of the jobbers are evidently doing a very good business, but others are disposed to complain a little. The volume of business coming in to manufacturers in nearly all lines gives them all they want to do, even where they are not among those whose order books are overcrowded. There is no doubt that the rainy weather which has prevailed has interfered somewhat with business. The coal strike, too, has had an unfavorable effect on trade. Many manufacturers are put to inconvenience and expense on account of difficulty in obtaining fuel and there is a probability that the influences at work, if long continued, will affect the price of goods in a number of lines. Reports from retail merchants reflect in general a very satisfactory condition of things. Labor is undoubtedly well employed and at good wages; farmers as a rule are prosperous, with money to spend, and merchants and manufacturers, as well as capitalists generally, are disposed to conduct on a liberal scale enterprises in which they are engaged and in many cases to extend their operations. The fact that Hardware manufacturers are generally adding to their manufacturing facilities is a feature of the present situation, pointing to a time when there will be enough goods. Competition in various so-called controlled lines is springing up most vigorously, promising lively times in the not distant future. All this, however, involving though it does something of a weakness in these lines, it must be remembered is consistent with the general strength of the market.

Chicago.

(By Telegraph.)

In many respects business in lines of Hardware is not entirely satisfactory both from the standpoint of the manufacturer and the jobber. A few jobbers report the volume of business in excess of the corresponding time a year ago. Others do not hesitate to state that they could readily handle a much larger volume of business. There is general renewal of complaint that goods ordered from manufacturers months ago have not been received and there are frequent delays of goods in transit, the orders for which have been placed more recently. Some lines of Builders' Hardware which were ordered last January have only been received during the past week, but as these are staple lines and stock orders no

inconvenience has resulted from the nonarrival. In many cases, however, of similar instances much annoyance and possibly some loss has been sustained. As a rule, however, manufacturers of Builders' Hardware report that they are much better caught up with old contracts, although a few are 60 days behind in making deliveries. Local stocks have recently been replenished and deliveries for quick shipment can now be more readily filled from local stocks. While there is a liberal movement in miscellaneous goods, especially for those usually wanted in autumn and winter, the demand for Toys, Skates, Sleds and such other goods for the holiday trade is much more active and increasing from day to day. The excellent trade in Cutlery also calls for special attention. Manufacturers of Bolts and Screws, while acknowledging a fair volume of business, note that they have not received as yet important business, reporting that the wet weather during the summer and the heavy rains more recently in the West, which have produced heavy roads, have delayed business to a considerable extent. The cancellation of many orders for Anthracite Stoves is also reflected in the less demand for Bolts from Stove manufacturers. To some extent, however, Gas Stoves, Soft Coal Stoves and Wood Stoves are taking the place of the Anthracite Stoves, the orders for which have been canceled. It is probable, however, that such manufacturers do not consume an equal amount of Bolts as do the Anthracite Stove manufacturers. As far as prices of Screws are concerned they are still unsatisfactory, as they have been for many months. Advices through agents who have recently returned from the Missouri River are somewhat discouraging. Jobbers in that section are reported to be somewhat restive under the absence of seasonable trade which has resulted from the heavy rains and poor roads, preventing the marketing of produce from the country. It is notable that manufacturers through agents are placing liberal orders for Paint with Hardware dealers in this section and there seems to be a feeling prevailing that this sort of trade will expand rapidly. Some manufacturers' agents report a liberal distribution of Padlocks, Steel Hatchets and Hammers and a good consumptive demand for Enameled Goods. One branch of the trade to which attention has been called recently by various reports and rumors is the Nail and Wire trade. It is claimed some cutting of prices has been indulged in in various sections, but as far as the Chicago district is especially concerned it has been the exception rather than the rule and the reduction of prices has not exceeded 5 to 10 cents. Although production has been curtailed to some extent there is evidence that more Nails are offered than present requirements are able to take care of promptly.

St. Louis.

(By Telegraph.)

The month just closed has been a banner one in trade conditions among the Hardware jobbers at this point and from present indications a falling off in the demand is hardly to be looked for for some time to come. Reports of a 50 per cent. increase in the volume of business for corresponding periods over last year are heard. Dealers, large and small, have found it necessary to carry large and more complete stocks, and the hesitating feeling which has been manifested at other periods has not shown itself this season. Owing to the remarkably cool and wet summer the demand for Carriage and Wagon Hardware, such as Tires, Bolts, &c., has been curtailed, and a comparison with last season's demand shows a large falling off. Supplies generally in the Heavy department of the market are moving on moderate lines. Wire products, which last fall figured largely in the jobbers' list, have not been given the same amount of attention this season and the volume of trade in this direction has therefore been on a much smaller basis.

Philadelphia

SUPPLER HARDWARE COMPANY.—There is no material change in Hardware since our last letter and practically the same activity and distribution may still be reported

as unabated. A satisfactory call for season goods still continues. We all experience some difficulty in goods reaching customers, owing to the continued scarcity of cars.

We regret to say that there is no change in the situation of the coal strike in our State, which has caused a feeling of depression in that location as well as anxiety all over our State as to the possibility of obtaining anthracite coal for the winter season, which is almost upon us.

Collections are not up to the usual standard at this time, October 1, when large remittances are looked for. The outlook for fall trade continues good.

Cleveland.

THE W. BINGHAM COMPANY.—There is an active demand for all kinds of Hardware and Mining and Milling Supplies, showing quite conclusively that artisans all over the country are very busy. Orders that were taken early for Stove Boards, Elbows, Sheet Iron and the like are now going forward as rapidly as possible. Some difficulty is experienced in getting them fast enough to supply the demand, but the scarcity does not seem to be confined to any one section.

There is a large consumption of all kinds of goods going on all over the country, and goods that are made of cast iron and steel have been quite slow in going forward from the factories on account of the manufacturers' inability to get pig iron, sheet steel, &c., fast enough to make up the goods, so some lines have been a little slow in going forward to the trade. However, we are now catching up with our orders and hope to have them all filled shortly.

Every line of business seems to be in a flourishing condition and every mechanic seems to be occupied. On the whole the present trade and the outlook for the future are very good. Collections are quite satisfactory for this time of the year.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—With last week's clearings showing an increase of 80 per cent. over last year, and harbor docks lined with deep sea tonnage, both sail and steam, to take away our grain from this year's harvest and lumber from our mills, things "look good to us." Weather this fall has been all that could be wished for to make a successful harvest. Grain and hops are now in warehouse, and we are ready for the fall rains. While wheat in Europe shows but little change over that of a year ago the farmers of the Pacific Northwest will net 10 or 11 cents per bushel more on account of the lower charters, a large amount of money when crop runs upward of 40,000,000 bushels.

We note the scurrying to cover in Wall street since call money has advanced to 15 and 20 per cent. and reserves below limit. This foreshadows the days of wrath to come, and ultimately indicates what legitimate business will be up against. There is much whistling to keep up the courage and grasping at straws that will not save them. When gold en route from Australia is banked on three weeks before arrival, and in small amounts at that, it shows the desperate straits the speculators are in. It will not be long before terrapin, canvasback ducks and champagne will be as much of a novelty in Wall street as it was from 1893 to 1896.

Trade is good in this section, so we will let the other fellow walk the floor rustling for his 20 per cent. money.

Omaha.

LEE-GLASS-ANDRESEN HARDWARE COMPANY.—Throughout all the territory within reach of Omaha there is more activity on the part of consumers than ever before and stocks melt away rapidly under the pressure of steady demand. The mass of consumers are now fairly well equipped financially and it would seem that there is every probability of money becoming still more plentiful as the season advances, owing to the marketing of heavy crops, so that future prospects for business present a very encouraging aspect.

Everything from a business man's standpoint seems to be favorable and no discouraging features are in evidence or apprehended.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The cool spell of weather early in September has had a tendency to stimulate business very materially and we are pleased to advise you that this improved state of affairs is being maintained. In fact, the Hardware business in this market is more satisfactory than we anticipated. The houses are all very busy and the demand seems to cover a general line of Hardware.

Inquiry among the retail dealers in various lines of goods in this city reveals the fact that they have all the business they can take care of.

We are all happy, and every one in this section of country is expecting to attend the annual Horse Show held in this city October 7 to 11 under the auspices of the Retail Merchants' Association.

San Francisco.

PACIFIC HARDWARE & STEEL COMPANY.—So far the year has been one where all the climatic conditions have been very favorable to the coast, with a promise of plenty of rain during the winter. Forest fires have been very numerous this year, destroying large quantities of valuable timber, the destruction of which has aroused the public, and all are clamoring for the Government to adopt some stringent laws for the protection of our forests, as the lumber interest on the Pacific Coast is one of its greatest resources and should be fully protected.

The Sporting Goods line is now particularly active as the winter shooting is about to commence.

Building operations show no signs of decrease and Building Hardware therefore is moving quite rapidly.

Returns from the harvest are now coming in and money is quite easy.

Louisville.

W. B. BELKNAP & Co.—The market is still active in all lines. There seems to be no let up in the broad consuming demand for all classes of goods. It seems as though all the housewives in the land must be indulging in new cooking utensils and home furnishing goods, every farmer getting a new outfit of implements for his next season's work and every carpenter and machinist lining up his kit with the latest and most improved tools.

The railroads are overburdened with freight. Everything seems prosperous, save in the region of the coal strike, East, and, judging from the outbreaks there lately, we should say that that was now soon to be settled. It is a pity, but it seems to be true, that in all such great struggles blood has to be shed and human sacrifice has to be made before the parties to it will yield.

NOTES ON PRICES.

Wire Nails.—The market, including to a greater or less extent the points of principal importance throughout the country, has been affected unfavorably by the lower prices made in connection with the manipulation of freight rates in the South and Southwest and the active competition which has characterized the market, as a result of which the regular schedule of prices was in many cases shaded 5 to 10 cents. In view of this condition the leading interest to-day announce a reduction beyond the prices which they have been quoting. Touching on this matter the American Steel & Wire Company make to-day (Wednesday) the following announcement: "For some time, owing to the varying conditions throughout the country, our schedule of prices has become more or less out of line. Our principal Wire products bear a certain relation to each other, and as it is our endeavor to meet present conditions affected by the low price of Nails we have adopted the following schedule, so that all the leading Wire commodities will be in line, this schedule going into effect October 1, f.o.b. Pittsburgh:

Wire Nails, carload lots.....	\$1.90
Wire Nails, less than carload lots.....	2.00
Plain Wire, carload lots.....	1.80
Plain Wire, less than carload lots.....	1.90
Barb Wire, carload lots.....	2.20
Barb Wire, less than carload lots.....	2.30
Staples, carload lots.....	2.05
Staples, less than carload lots.....	2.15

Galvanizing, extra 30 cents, instead of 40 cents as heretofore."

These reductions in price are made with a view to correcting irregularities and putting the market on a firm basis in view of the very satisfactory demand, which is, we understand, in excess of that of last year. It is expected that a conference of the independent manufacturers will be held in Chicago at an early date.

New York.—Wire Nails are in good demand at this point and quotations ruling are those in force for some time past, as follows: Single carloads, \$2.20; small lots from store, \$2.25 to \$2.30.

Chicago, by Telegraph.—A conference of the independent manufacturers of Wire Nails is being held on October 2, at Chicago, to consider the situation, and there seems to be a prospect of speedy adjustment of any differences which may exist resulting from a better understanding. The demand has not been active and some exceptional sales have been made on the basis of \$2.05 to \$2.10, while the general market has been at \$2.15 in carload lots. In not a few instances what appears to be lower prices for Nails is attributed to lower freight rates, released prices being made to various Western and Southern points. As a rule shipments are very prompt. In a jobbing way sales are made at \$2.20 to \$2.25, Chicago.

St. Louis, by Telegraph.—The demand for Wire Nails at this time is fair and the movement is considerably behind that of last season. Prices are unchanged since our last reports, carload lots being quoted at \$2.25 and small lots from store at \$2.30.

Cut Nails.—At the regular monthly meeting of the Cut Nail manufacturers prices ruling in September were reaffirmed for the month of October. Some of those at the meeting were of the opinion that the cost of material justified a small advance, while others felt that in the present condition of the Wire Nail market an advance in price would be injudicious. Steel Nails are somewhat scarce, while Iron Nails are hard to obtain. Quotations are as follows: \$2.05, base, in carloads, and \$2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—The local demand for Cut Nails is fair, with no noticeable change in the condition of the market. Quotations for carloads and less than carloads are as follows:

Carloads on dock.....	\$2.18
Less than carloads on dock.....	2.23
Small lots from store.....	2.30

Chicago, by Telegraph.—While Iron Nails are in light supply the demand is not especially active and Steel Cut Nails are quiet and steady. Carload lots are sold at \$2.20, base, less than carload lots at \$2.30, with 5 cents extra for small quantities from store. It is notable that deliveries have improved somewhat, goods now being delivered within two weeks of the placing of orders.

St. Louis, by Telegraph.—Cut Nails are quoted at \$2.40 in small lots from jobbers' stock.

Barb Wire.—The demand is not large, and the market is subject to some unevenness in prices. The last named conditions are the most pronounced in the Southwest. The American Steel & Wire Company to-day announce as above stated the following reduced prices, f.o.b. Pittsburgh:

Barb Wire, Painted, carloads.....	\$2.20
Barb Wire, less than carloads.....	2.30
Galvanized, 30 cents extra.	

Chicago, by Telegraph.—There have been further reports of rebates made by manufacturers and concessions by jobbers to consumers resulting from keen competition, although the demand is not especially active. While prices are a little irregular general quotations remain at \$3 to \$3.05 for Galvanized and \$2.50 to \$2.75 for Painted in carload lots, with 5 cents extra for small quantities from store.

St. Louis, by Telegraph.—The Barb Wire market at this point has felt the effect of the unsettled price conditions and the volume of demand is very moderate.

Painted continues to be quoted at \$2.90 and Galvanized at \$3.20 in small lots from jobbers' stock.

Plain Wire.—The majority of orders call for small lots, so that the demand is in no way equal to the capacity of the mills. Prices are somewhat irregular, particularly in the Southwest. The American Steel & Wire Company to-day announce the following reduced prices, as stated above, f.o.b. Pittsburgh:

Plain Wire, carloads.....\$1.80
Plain Wire, less than carloads..... 1.90
Galvanizing, 30 cents extra.

Chicago, by Telegraph.—The same remarks concerning the relative condition of the production and consumption of Nails and Barb Wire applies to Plain Wire, but delivered prices which are being made in the West and South are as much, if not more, due to lower freight rates than to any cutting of mill or store prices by manufacturers or jobbers. In carload lots on track \$2.10 to \$2.15 and in jobbing lots \$2.20 from store is asked.

St. Louis, by Telegraph.—No new features are to be noted in the market for Plain Wire and the volume of demand is referred to as fair. In small lots from jobbers' stocks No. 9 is quoted at \$2.25 and Galvanized at \$2.65.

Steel Goods.—Announcement has been made of their base discounts and extras by the manufacturers of Steel Goods whose interests are merged in the American Fork & Hoe Company. The base discounts are changed in some respects, as indicated by those of one of the leading manufacturers, which we print in full below. Classified lists of the trade have been prepared, according to which prices will be graded. In a general way it may be said that the smaller merchants will be entitled to purchase regularly at the base discounts, with an extra discount of 20 per cent. The terms for the season 1902 and 1903 are 60 days from date of shipment, with a discount of 2 per cent. for cash in 10 days. Shipment of regular or light Steel Goods for spring trade between November 1, 1902, and February 1, 1903, will take 60 days from February 1, 1903, with a discount of 2 per cent. for cash February 10. A charge of 2½ per cent. will be made for direct shipment to jobbers' customers. The base discounts are represented by the following, which are those of the Iowa Farming Tool Company, Fort Madison, Iowa:

<i>Forks.</i>	Discount from list.
Victor Hay.....	.66 2-3%
" Manure.....	.60 and 20%
" Header.....	.66 2-3%
Columbia Hay.....	.66 2-3 and 5%
" Manure.....	.70%
" Spading.....	.70 and 10%
Champion Hay.....	.66 2-3%
" Manure.....	.60 and 20%
" Stable.....	.66 2-3 and 20%
" Junior Header.....	.66 2-3%
" Header, Regular.....	.66 2-3%
" Deep Dish.....	.66 2-3%
Two-Tine Hay, Boys'.....	.60%
Three-Tine Hay, Boys'.....	.60 and 7½%
Two-Tine Hay, Regular.....	.60%
Diamond Tine Hay, Two and Three.....	.60%
Corn or Fodder.....	.65%
Fish, One, Two and Three.....	.60%
Three-Tine Hay, Regular.....	.60 and 7½%
Four " ".....	.66 2-3%
" Manure.....	.60 and 20%
Five " ".....	.60 and 20%
Six " ".....	.60 and 20%
Heavy and Light Spading.....	.70 and 5%
Half Polish and Jumbo Spading.....	.70 and 5%
Five-Tine Spading.....	.70 and 5%
Boys' Spading—See Sundries.	
Long Three-Tine Hay, 13-inch.....	.60 and 7½%
" " " 14-15 inch.....	.60 and 20%
Three-Tine Header.....	.60 and 20%
Three-Tine Hay Balers.....	.60 and 20%
Four " ".....	.66 2-3%
Round and Square Shoulder Header.....	.66 2-3%
Grain and Barley.....	.70%
Dig-Ezy Potato.....	.65%
*Farmer's, No. 10.....	.50%
*Vegetable, No. 88 and No. 810.....	.50%
Stone Pickers, No. 6L.....	\$.50
" " No. 6H.....	.575
" " No. 60H.....	.625
*Sugar Beet.....	.50%

* These Forks are not subject to rebate, and not sold as Steel Goods.

*Coke50%
*Sluice and Stone.....50%

Hoes.

Cut-Easy, No. K1 and No. K2.....	.70 and 10%
" " No. K5.....	.75 and 7½%
" " No. K10, K11, K12.....	.75, 5 and 2½%
Crucible.....	.70 and 10%
Corn.....	.70 and 10%
Garden.....	.70 and 10%
Ladies', Toy and Boys'.....	.70, 10 and 5%
Meadow and Rhode Island.....	.75 and 2½%
*Riveted Socket.....	\$1.55 net.
" Shank.....	1.50 net.
Nursery.....	.70, 10 and 5%
Mortar and Mixers.....	.75 and 7½%
Street, Solid Shank.....	.75 and 7½%
*Street Commissioner.....	.65%
Dixie Planter.....	.70 and 30%
" " Straight Shank.....	.75 and 20%
Fort Madison Cotton.....	.75 and 7½%
" Cotton-Field," Shank.....	.75, 10 and 5%
" " Socket.....	.70, 20, 10 and 5%
Texas Cotton.....	.75 and 7½%
Southern Meadow.....	.75, 5 and 2½%
Cotton Chopper.....	.75, 10 and 7½%
Sugar Cane.....	.70 and 30%
Dixie Tobacco or Plantation.....	.75 and 20%
*Sprouting.....	.40 and 10%
*Mattock, No. 75.....	.66 2-3%
*Junior Mattock, No. 77.....	.66 2-3%
*Crescent Cultivator.....	.75 and 10%
" Double Bit.....	.75%
*Scuffle, No. 82 and No. 82½.....	.65 and 5%
" R. R., No. 84.....	.66 2-3%
" " No. 88.....	.60 and 10%
Triangular Onion, No. 19.....	\$1.75
" " No. 20.....	2.10
*Victor Garden Cultivator.....	.50%
*Sugar Beet, No. SB1.....	\$4.00
" " No. SB4.....	2.50
" " No. SB6.....	3.40
" " No. SB06.....	3.80

Rakes.

Prize Bow Braced, Steel.....	.70 and 5%
Peerless Shank, Steel.....	.70 and 5%
Peerless Socket, Steel.....	.70 and 5%
*Toy Shank, Steel.....	.70%
" Level-Head " Solid Steel.....	.70 and 5%
*Mail, Heavy Braced Curved.....	.70 and 10%
*Mail, Light Braced Straight.....	.70 and 10%
*Mail, Heavy Sgl. Shank, Straight.....	.70 and 10%
*Lawn, No. 1.....	.70 and 10%
*Lawn, No. 2.....	.70 and 5%
Turf Edger.....	.60%

Weeders.

Iowa and Three-Prong.....	.70 and 10%
Two-Prong.....	.70 and 10%
Round Point.....	.70 and 10%
Square Point and 4 and 6 Tooth.....	.70 and 10%

Hooks.

Champion Potato, Steel.....	.66 2-3%
No. A 4, Steel.....	.66 2-3%
Four and Five Steel.....	.66 2-3%
Six steel and Five Malleable.....	.66 2-3%
Manure, four, five and six tine.....	.66 2-3%
Jumbo, Hop or Stone.....	.66 2-3%
Clam, Six-Tine Steel.....	.60 and 10%

Sundries.

Not classed with Steel Goods.

Handles.....	.50 and 10%
Fingers, Cradle and Barley.....	.55c. net.
Sundries, Snath Malleables.....	.40%
Handle D Tops.....	.50%
Ferrules.....	.70%
Ferrule Caps.....	.60%
Garden Tool Sets, No. 3.....	.20%
Garden Tool Sets, No. 4.....	.20%
Garden Shovels.....	.25%
Boys' Spading and Champion Forks.....	.25%
Side Walk Cleaners.....	.40 and 10%
Ice Chisel.....	.40%
Cattle Prod.....	.25%
Corn Hooks.....	.40%
Corn Knife.....	.33 1-3%
Shepherds' Crooks.....	.20%
Shepherds' Crook Handles.....	.40%
Bonner Stable Forks.....	.20%
English Stable Forks.....	.20 and 10%
Barley Forks.....	.50%
Ox Yokes.....	.10%
Ox Bows.....	.10%
Animal Pokes.....	.20%
Tool Rack.....	Net.

* Not classed with nor sold as steel goods.

Roofing Paper.—The demand for this commodity is still very good and prices are firm. The dry Felt, or paper, as it is called before saturation, has advanced and is likely to reflect itself in the price of the manu-

factured product in the near future. This statement applies perhaps more particularly to the West, where there is an open market and no combination, with prices on a hard pan basis. In the East, where the market is under control, there is a much larger margin of profit and not the same necessity for a quick adjustment of prices to meet advances in raw material. Here the manufacturers do not get together so quickly since the understanding arrived at last spring.

Cordage.—A steady but rather limited demand characterizes the Rope market, owing to the fact that most orders are for small lots. Quotations range, on the basis of 7-16-inch and larger, from 9½ to 10 cents for Sisal and from 12½ to 13 cents for Manila Rope.

Shovels and Spades.—The market for Shovels and Spades continues in a somewhat unsatisfactory condition and the associated manufacturers have to recognize an increasing number of competitors from whom practically all the leading kinds of goods can be obtained. The drift of the trade on fourth-grade goods to the cheaper so-called animal brands is not regarded as a satisfactory feature. The manufacturers, whether in the association or out, are, however, full of business and most of them could dispose of more goods if they had the facilities for turning them out. The independent manufacturers will meet next week in Louisville for the purpose of discussing market conditions and perhaps forming an organization which will tend to improve the general situation.

Paints and Colors.—*Leads.*—Unsettled weather during the week has interfered somewhat with the consumption of White Lead in Oil. Quotations are as follows: In lots of 500 pounds or over, 6 cents per pound; in lots of less than 500 pounds, 6½ cents per pound.

Glass.—The uncertain conditions of the Glass market have not by any means disappeared, but the opinion is expressed that self interest will dictate a conservative course being followed by manufacturers, and it is hoped that prices will be maintained during the coming fire. The National Window Glass Jobbers' Association has placed an order for 400,000 boxes of Glass, of which the American Company will furnish 275,000 boxes and the Federation Company the remaining 125,000. The price paid was 88 per cent. discount from the manufacturers' list, which is the same price paid for the 500,000-box order placed last April. The difference between the manufacturers' list, which they buy at, and the jobbers' list, at which they sell, is about 33 1-3 per cent. The Glass is to be delivered during October, specifications to be in by the 10th of the month. It is more or less of an open secret that the order was placed against the better judgment of some members of the association and it is reported that all members of the association will not take their allotments. The price is also considered higher by some, in comparison with that of outside Glass being sold in this market. The question of wages and the date of starting the factories are yet to be settled. The Jobbers' Association quotations are as follows for single and double strength Glass:

	Discount.
From store.....	88 and 5 %
F.o.b. factory, carload lots.....	89 and 5 %

Spirits Turpentine.—The local market continues dull but strong, owing to advices from the South to the effect that receipts of Turpentine are being taken for export. In this market Southerners are quoted, according to quantity, from 50 to 50½ cents per gallon and machine made barrels from 51 to 51½ cents per gallon. It is reported that seven prominent Turpentine concerns in the South will form the Consolidated Naval Stores Company, who will be incorporated with a capital of \$2,000,000. The combination, it is reported, will handle the output of 500 producers and is expected to do an annual business of \$11,000,000.

S. F. HAYWARD & Co., formerly at 357 Canal street, New York, have just removed to 20 Warren street. This incorporated company are dealers in Fire Apparatus, Rolling Stock and Fire Department Supplies, Portable Fire Extinguishers and Automatic Fire Extinguishers. The business was established in 1868 in New York as the agency of the Babcock Fire Extinguisher, made by

the Fire Extinguisher Company, Chicago, Ill., for which they are still the Eastern headquarters. They are also agents for the Holloway Chemical Engine Company, Baltimore, Md., and Rumsey & Co. and Gleason & Bailey Mfg. Company, both of Seneca Falls, N. Y.

ELECTRICAL GOODS IN THE HARDWARE STORE.

A Merchant's Suggestions.

ELECTRICAL goods are not yet generally handled by the Hardware trade. This is probably due to the fact that the development in the electrical line has been exceedingly rapid, and with all the details of the Hardware business few merchants have been inclined to take up this line.

All Hardware stores carry some goods that are used in electrical work—Bare Copper Wire and Insulated Wire. Electrical supplies being made up largely of metal goods, it would seem that the natural place to go for such goods is the store where other metal goods are commonly found—the Hardware store.

Of course much in the electrical line are goods which to sell it is necessary to install, and it would be important to employ at least one man who has had experience in putting in electrical Bells and doing general electrical work.

Small electrical apparatus, such as Batteries, Bells, Battery Supplies, as well as Electric Fans, have quite a ready sale over the counter. In these goods there is a satisfactory margin of profit, being from 40 to 60 per cent. Almost every house being built to-day has more or less electric fixtures, Door Bells, Annunciators, &c., while many factory buildings are being equipped with electric telephones in place of the speaking tubes.

What has been said in favor of the paint trade applies to electrical goods, as the Hardwareman coming in touch with prospective builders and contractors has the first opportunity of calling attention to this line and giving estimates on these goods.

As nearly all Hardware dealers either sell more or less complete lines of machine tools as a part of their regular stock or act as brokers for machine tool manufacturers, they are very apt to know in advance the possible requirements of many of their customers for motive power. This being the case, it seems perfectly reasonable for them to carry a fair line of Electric Motors and be prepared, through working arrangements with the manufacturers of these Motors, to supply the wants of their customers for motive power at the same time they supply their wants for machine tools.

Electric Motors as now made are so sturdy in design, efficient in operation and easily installed that no trouble should be experienced in effecting sufficiently frequent sales to make the carrying of such a line desirable and profitable.

The small Motor is particularly adaptable to the wants of the repair shop man or small manufacturer who hires a room or two for his business. The Lathes, Saws, Grinders, Forge Blowers, Drills and other similar machines such as are usually found in these shops can very readily be operated by means of electricity supplied from a central station, and as no particular engineering is required to adapt a Motor to such work, its sale comes logically within the province of the Hardwareman.

The Hardware dealer is in a particularly good position to introduce Motors to the attention of his customers, for he is usually pretty familiar with their business, their equipment and their prospective requirements; if he has a small stock of Motors on hand, he will be able to make immediate deliveries while the customer is interested and before reconsideration possibly would determine the customer not to buy.

If Hardware dealers would take the initiative by carrying a small stock and become acquainted with the possibilities in the use of Electric Motors, and then canvass their list of customers with a view of substituting Motors for other methods of machine driving, they could doubtless obtain very satisfactory profit from this side line.

Paints in the Hardware Store.

We give below extracts from a number of letters which have come to us from manufacturers and merchants in regard to the evident tendency on the part of the Hardware trade, both wholesale and retail, to be distributors of Paints. It will be observed that there is practical unanimity also on the part of our correspondents in the opinion that this line of goods should be sold in connection with Hardware

the tendency has been, as far as we have observed, for the Hardware people to add it to their line if they have not already carried it. At least this has been our experience in jobbing Paint for the last year or two. We would say that over 50 per cent. of our Hardware concerns carry Paint in some form.

WHAT HARDWARE JOBBERS SAY ABOUT THE SALE OF PAINTS BY RETAIL HARDWARE MERCHANTS.

THE following letters from Hardware jobbers are significant as indicating the extent to which retail Hardware merchants are selling Paints:

Hardware Dealers Have the Advantage.

From an Illinois Jobbing House: It is the writer's opinion that Paint is being more generally handled by the Hardware trade and it is becoming quite a branch of the business. Many of the Hardware dealers are handling it to quite an extent, but the Paint generally handled by the Hardware jobber is put up under his own special brand. As regards the makes of paints that are generally handled throughout the country, will say that most of the old and established lines of Paint put up under the manufacturers' own brands are generally handled by regular Paint dealers in connection with wall paper, drugs, &c.

It is the writer's opinion that paint can be handled by retail dealers to splendid advantage, as the Hardware dealer has the first chance with the customer to sell it. A man building a house or barn has to have his Hardware long before he thinks about Paint and it gives the Hardwareman a chance to get at him first, and a customer naturally prefers to buy everything he needs at one place if possible.

Will Add Paints to Their Stock.

From a Western House: We have been contemplating adding a line of Paints to our stock, as we find that nearly all retail Hardware stores throughout the State are adding this line, and the only people in this section of the country who handle Paints are the lumber dealers.

Paints Invariably Carried in this Section of the Country.

From a Jobbing House in North Carolina: I hardly know of a Hardware store that does not carry a line of Paints in this country. So far as this section is concerned you will find no Hardware store that does not carry them. I frequently look in *The Iron Age* at the quotations on Paints, Oils and Varnishes and think you would make no mistake in interesting yourself in this line, as it is very closely connected with the Hardware trade.

A Notable Increase in the Sale of Paints.

From Jobbers in Illinois: Within the past two years an epidemic of Paint business has swept over the Hardware trade. To just what extent it has been taken up by the retail dealers we are not able to say exactly, but we believe 80 to 90 per cent. of the retail trade in our section of the country are now handling Paints. Whether or not it has turned out to be a profitable investment is still an open question, but it would seem that the line should be one that could be handled advantageously by the Hardware trade.

The Aggressive Merchant Handles Paints.

From West Virginia Jobbers: Our experience is that the aggressive retail Hardware dealers are carrying and pushing Paints, which work in admirably with Window Glass, &c., and we see no reason why this department should not be generally profitable.

Observes a Tendency to Add Paints to Hardware.

From a New England House: Through the East the Paint business is done largely by the Hardwaremen, and

Have Placed Paints in Their Stock as Regular Hardware.

From a Wholesale House in Michigan: Our observations show that Paints and Oils are now pretty generally handled by all the retail Hardware dealers. In fact, this part of the business has become so general that we have just decided to place Paints in our stock as regular Hardware and will hereafter carry a full supply of Paints for the accommodation of our retail customers.

This condition has developed largely within the last few years. Prior to that time Paints were carried by the drug houses and lumber yards almost exclusively, but now the Hardware dealers have pretty generally added them as part of regular stock.

We believe that Paints properly belong to the Hardware trade and we know that all the retail dealers who now handle Paints have made arrangements to handle them profitably to themselves. We believe that in the next few years the Hardware dealers will be practically the large distributors of Paints and Oils.

A Very Satisfactory Line to Handle.

From an Iowa Jobbing Concern: We took up Paint about two years ago and have found it a very satisfactory line to handle. We felt compelled to take up the line owing to the fact that such a large portion of the retail Hardware trade were already handling it. During the past two years the number handling this line has increased very largely, and we presume that now 50 per cent. of the Hardware dealers in Iowa handle this line.

Hardware Store the Natural Channel.

An Alabama House Write: As a rule, the retail Hardware trade of this section do not carry a stock of Paint. It is the exception when they do. We handle and job Paint, and there is one other jobber of Hardware that carries a stock in the city. We think that the Hardwareman who is furnishing all other kinds of material that go into the construction and furnishing of houses is the natural channel for the supply of these goods, and that the Hardwareman is taking a step in the right direction in adding this line to his other stock.

Sometimes it is Inexpedient.

From a New England House: It depends very largely upon the localities in which the Hardware trade is located in regard to the handling of Paints. In localities where there are large wholesale and retail Paint and Oil dealers I do not think it would be wise for the Hardware trade to carry it, but in localities where there are no such large Paint houses this commodity can be carried very advantageously by Hardware dealers. We have been in the Paint and Oil business for a good many years, and while there are some drawbacks to it, in the way of bad accounts, on the whole we consider it quite a good line for us to handle.

An Agreeable Experience.

From a Maryland House: Our attention had been called some two or three years ago by the Paint manufacturers to the facts as alleged by them that the Paint business throughout the United States was rapidly changing from the drug trade, where it had been generally handled, to the Hardware trade, and that the latter dealers were in their opinion those best calculated to be its distributors. We felt a great hesitation about undertaking a line with which we had so little acquaintance, but finally accepted the agency of one of the largest concerns in the United States, and must say that we have found the state-

ments true as made by the manufacturers, that it was a line suited to the retail Hardware dealers, and our experience has been very satisfactory in acting as the distributors for the factory we represent.

A New York House Find Competition Troublesome.

We handle Paints in a small way. We believe there are quite a few retailers in the Hardware trade who are selling this article. Whether a man may be successful in it depends largely upon his ability to dispose of it at a profit. The one drawback for launching out in this line is the great competition in it at the present time. It is sold by drug houses in nearly all places of importance and also by many other dealers who are not legitimately in the Hardware trade.

There are many inferior lines on the market, which makes competition the greater. We think the dealer would have to use a great deal of judgment about it.

Fits in Very Nicely with Builders' Hardware.

From a Jobbing House in New York State: Were actually forced into handling Paint in our retail department, there being such a demand for it. We have been agreeably surprised at our sales and find that it fits in very nicely with our Builders' Hardware, and we have advised our friends that we consider it a valuable addition to our stock.

Contemplating Handling Paints Later On.

From a Southern House: Our information is that Paints are handled pretty extensively by the retail Hardware trade, and in fact the trade in general in this section, and the business bids fair to drift into the hands of the Hardware trade exclusively. We do not handle Paints, but will perhaps do so later on.

WHAT MANUFACTURERS SAY ABOUT THE SALE OF PAINTS BY HARDWARE MERCHANTS.

The following letters indicate the drifting of the Paint business from the druggist to the Hardwareman. They are significant especially as showing that the manufacturers regard Hardware merchants with decided favor as a channel for distributing their products:

Hardware Dealer the Better Man to Handle Paints.

From an Illinois Manufacturer: We consider the Hardware dealer is the better man to carry a line of Paints, where his patronage can be obtained, but for some reason unknown to us the druggists take the greater part of the business. Paints are certainly a part of builders' supplies and we think would work more harmoniously with Hardware stock than with druggists. There are also quite a number of lumber yards carrying Paints, and in the very small towns it is carried almost exclusively by the general merchandise dealer.

Many of Their Customers are Hardwaremen.

From an Eastern Manufacturer: To the best of our knowledge and belief practically all Hardware merchants handle Paints and Varnishes, and this company have on their books the accounts of a number of Hardware concerns throughout the neighboring States.

We would, however, state that most of our business is from Paint and Varnish jobbers and dealers. At the same time, as above stated, we do sell quite a quantity of our goods to the Hardware trade.

A Growing Tendency to Handle Paints

From a Manufacturer in Missouri: We believe there has been during the past few years a growing tendency on the part of the Hardware trade to get into the Paint business, and such trade as we have had among the Hardware dealers has been very satisfactory and we certainly consider the Hardware trade a nice sort of trade to do business with.

We think that possibly one reason for the increase of Paint business among the Hardware trade, particularly in this Western country, is from the fact that quite a number of Hardware jobbing houses are handling Paints and naturally salesmen from these houses calling upon

the retail Hardware trade have been instrumental in getting them started with a Paint line.

Paint Business Belongs Naturally to Hardwaremen.

From a Prominent Michigan Manufacturer: During recent years there has been a very considerable increase in the number of Hardware merchants handling Paints. The distribution of Paints at retail in the past has been largely in the hands of the drug trade and naturally a very considerable volume of business is still handled by that trade. It is quite evident, however, that this business is gradually, and in some sections rapidly, drifting away from the druggists and into the hands of the Hardware people, where, as a matter of fact, it in our opinion properly belongs. We believe that Hardware dealers are in position, as a rule, providing they will only take hold of the proposition earnestly, to handle Paints, Varnishes and allied lines to much better advantage than the average druggist, and the fact that the distribution, as stated above, of this class of goods is gradually going into the hands of the Hardware merchants indicates clearly that they are commencing to realize that this business naturally belongs to them. We look for the time within the near future when a line of Paints, Varnishes, &c., will be a part of every Hardware stock.

The Sale of White Lead.

From a Manufacturer of White Lead: While the drug trade in the smaller country towns mainly distribute our product, yet there is a good percentage handled by the Hardware merchants throughout the country. We know of no reason why Paints generally and material should not be handled by the Hardware trade, unless it might be that they usually find, in the matter of Lead especially, that the margin of profit is seldom large enough to make the trade very profitable. Unfortunately White Lead is used by most dealers as a leader and it is sold at a very close margin of profit, even at times at no profit whatever, using it as a means to secure orders for other goods where there is a better margin. We do not think any larger proportion of the Paint business is handled by the Hardware trade now than, say, five years since. Our experience with the Hardware trade generally is that they are good pay, most of them being in good condition financially, and such as we have on our books we consider very desirable customers.

PRICE-LISTS, CIRCULARS, &c.

THE BOLEY WIRE FENCE COMPANY, Sandusky, Ohio: Heavy Woven Wire Fencing. The company's "Last a Lifetime" Fence is made of No. 9 Wire exclusively, securely fastened by a patent clamp. It is woven in the factory and shipped in rolls ready to stretch.

THE ARCADE MFG. COMPANY, Freeport, Ill.: Catalogue devoted to their line of Wood and Iron Toys for 1902 and 1903. A number of new goods are shown in connection with those previously made.

THE CHICAGO HOUSE WRECKING COMPANY, Chicago, Ill.: Machinery Supplies and Merchandise. Catalogue No. 127 contains 230 pages devoted to Merchandise, the bulk of which, it is stated, is strictly new and perfect.

WM. G. SMITH & Co., Philadelphia, Pa.: Columbian Air Rifles. An illustrated catalogue and price-list shows these Rifles in 1000, 500, 300 and single shot models.

SHEBLE & KLEMM, Frankford, Philadelphia, Pa.: Catalogue No. 50, Farm and Garden Tools. This business has been sold to the American Fork & Hoe Company, who intend to operate the factory exactly as it has been operated in the past, and to furnish to the trade the same class and character of goods as heretofore.

HAYS MFG. COMPANY, Erie, Pa.: Catalogue B, devoted to Water and Gas Specialties, Plumbers' Goods, Hydrants, Street Washers, Malleable and Cast Iron Fittings, Pipe, Tools, &c.

THE PACKER CYCLE COMPANY, Reading, Pa., Bound folder illustrating and describing seven models of Packer Bicycles.

JANESVILLE BARB WIRE COMPANY, Janesville, Wis.: Catalogue devoted to the Janesville truss braced diamond

mesh Woven Wire Fencing, Ornamental Gates, Fence Staples, Twisted Barbless Wire, &c.

THE A. DUDLEY MFG. COMPANY, Menominee, Mich.: Tools and Bicycle Specialties. These, shown in a catalogue and price-list, include Combination Wrenches, Nipple Grips, Wheel Truing Stand, Tire Separators and Feeders, Universal Frame Jigs, &c.

PENINSULAR STOVE COMPANY, Detroit, Mich.: Catalogue No. 208, devoted to Steel Ranges, Cook Stoves, Heating Stoves, Warm Air Furnaces and Hot Water and Warm Air Heaters.

BADGER BRASS MFG. COMPANY, Kenosha, Wis.: Solar Lamps. A catalogue illustrates, with prices, Solar Acetylene Cycle, Carriage, Automobile, Launch, Mining, Hunting and Stereopticon Lamps, Auto Horns and Electric Vehicle Lamps.

JOHN PFEIFER & Co., Philadelphia, Pa.: Price-list illustrating Shovels, Spades and Scoops. A large line of these goods are shown, including a variety of patterns.

THE FITCHBURG FILE WORKS, Fitchburg, Mass.: Hack Saw Blades and Frames. A neatly printed and illustrated catalogue and price-list shows Hack Saw Frames in two styles: No. 35, made of heavy spring wire, and No. 20, made from best grade of open hearth steel. Blades are shown for Hand and Power Saws under the name of "The Best." Another style, the Culley flexible Hack Saw Blades, is designed for plumbers, electricians, bicycle manufacturers and repairers, &c., for hand use only, principally for cutting brass, tubing, stringy metals, &c.

THE CHICAGO HARDWARE COMPANY, 132-134 Lake street, Chicago, Ill.: Catalogue and price-list of Standard Spindle Locks and Wrought Steel and Bronze Trimings.

STARKS, EDSON & Co., Saxton's River, Vt.: Water Paints for inside and outside use. These include Albameral, Hot Water Paint for inside use; Mineralba, Cold Water Paint for inside use; Exterior, Cold Water Paint for outside use; Victory Wall Finish and Cold Water Kalsomine. The Paints are intended to be applied with brushes in the ordinary manner, or they may be sprayed upon large surfaces by the use of coating machines.

HARDWARE BUYERS' ASSOCIATION.

THE HARDWARE BUYERS' ASSOCIATION at a meeting held in this city on Tuesday decided to discontinue combination buying and hereafter each house will place all business from its own offices. This association consists of the following prominent houses: W. B. Belknap & Co., Louisville, Ky.; Bigelow & Dowse Company, Boston, Mass.; Morley Bros., Saginaw, Mich.; Stauffer, Eschelman & Co., New Orleans, La.; Mackintosh, Huntington & Co., Cleveland, Ohio; Farwell, Ozmun, Kirk & Co., St. Paul, Minn.; Dunham, Carrigan & Hayden Company, San Francisco, Cal.; Richards & Conover Hardware Company, Kansas City, Mo.

SIMONDS MFG. COMPANY'S REMOVAL.

THE SIMONDS MFG. COMPANY have moved their New York office, under the supervision of L. A. Kimball, from 107 Liberty street to 40 Murray street, where they have much larger and more commodious quarters for the transaction of business. They will carry in stock good assortments of all regular standard sizes of the goods they make, which include Hand, Circular and Band Saws, Paper Knives, Planing Knives, Molding Knives, Molding Blanks, Jig Saws, Bevel Steel, &c. They have greatly increased their facilities for the purpose of promptly executing orders from stock and giving customers the best possible service. Their factories are in Fitchburg, Mass., and Chicago, Ill., Saw Steel being also made at the latter factory.

W. E. AUSTIN, vice-president of the Austin-Bryan Mfg. Company, Birmingham, Ala., has resigned his office and is no longer connected with the company. *He expects to engage in business for himself at another point at an early date.

Letters From the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Manufacturing Costs.

From a New York Correspondent: Your leading editorial in the Hardware department, issue of September 25, recalls an actual occurrence of some years ago which has a bearing on the point you make concerning merchants who do not include in their calculations all the costs of doing business and which, if included, would materially modify many offhand statements regarding the surprisingly small percentage of the cost of carrying on some businesses.

An American manufacturer, who also imported some kinds of goods, being in Europe, met one day in the street of a German city a manufacturer from whom he was buying a certain article, which previously he had bought of a competitor in the same city at a higher price, but who relinquished the trade as unremunerative. While the two were passing the time of day the other manufacturer from whom the goods were originally purchased came along and, stopping a moment, jokingly referred to the goods in mind, which finally led to a proposition from the low man that all three adjourn to a hotel and go over the items of cost in detail and, if the low man didn't show a profit, he would pay for the dinners for the three. After the various details had been compared and agreed to by the highest man, the latter staggered the low man by asking, "Where's your brass?" The article in question was made entirely of brass and the low man had omitted entirely the price of the raw material.

Size of Invoices.

From an Ohio Manufacturer: A great many firms do not use proper size invoice blanks. They invoice on blanks which do not allow space enough to check up the goods. For instance, we use the following check stamp for invoices, viz.:

Goods in
Remarks.....
Freight.....
Entered.....
Paid

And a great many firms' invoice heads are so short we cannot get stamp in without going to the trouble of pasting on extra paper.

The mention of the subject might be of interest and help to correct the evil, which possibly many have not thought of.

The Disturbed Shovel Market.

From a Manufacturer Outside the Association: The association in cutting prices necessarily compels others to follow, and while we did not follow what we considered a foolish lead of other independent makers in cutting prices rashly, we are following suit to the association and going them one better to the extent that we now practically say, "Come along with your orders, no reasonable offers refused."

At a time when all other steel products command exceptional prices by reason of the high costs not only of steel, but of all the materials that enter into manufacturing, as well as the high wages, it is deplorable that Shovels should require to be sold to-day at prices not much higher than they were sold at several years ago, and it does not seem to us that it is good business policy for either the independents or the association to establish price cutting, as has been done during the present year, and it would seem to us that it would have been better policy on the part of the association to try to establish a harmony of interests among Shovel makers,

such as we hear talked about so much among the railroads. However, we are in the market with goods which are declared to be as good as any on the market.

We are affixing to our regular fourth-grade goods, in order to be in the fashion, a special label known as the "Ram" label, which carries with it a guarantee as to the quality of the material, and we also affix to these Shovels our own name labels, so that the buyer understands that he is buying a labeled tool. We do not get out a catalogue, but we will be glad to send net prices to all inquirers, and our shapes and sizes conform to the standards in the trade, and we are prepared to furnish practically everything in the Shovel line, in either Plain Back, Back Strap or Hollow Back.

INCREASED TRADE RELATIONS WITH CHINA.

GEORGE T. HAWLEY, formerly of the Hawley Bros. Hardware Company, San Francisco, Cal., and at present in New York, is one of a party making a trip across the continent in the company of Ho Yow, Imperial Consul-General at San Francisco, who is also a brother-in-law of Wu Ting Fang, China's Minister to the United States. The Chinese Government has given Ho Yow a six months' vacation and he has availed himself of the interval to visit the principal cities of this country to study our business methods, facilities, &c. At the expiration of his leave of absence Mr. Ho Yow expects to resign his Government office and devote his entire time to the promotion of commercial relations between China and the United States. One method of accomplishing this result will be by opening Chinese commercial museums here, one of the first of which it is thought will be in St. Louis in connection with the World's Fair, and others to follow in New York, Chicago, Philadelphia, Denver and perhaps Kansas City. Upon his return to China in about three months he will lay the matter before the Imperial Government. It is also the intention to have American exhibitions made in China to more thoroughly disseminate knowledge of the manufactures and products of the United States.

TRADE ITEMS.

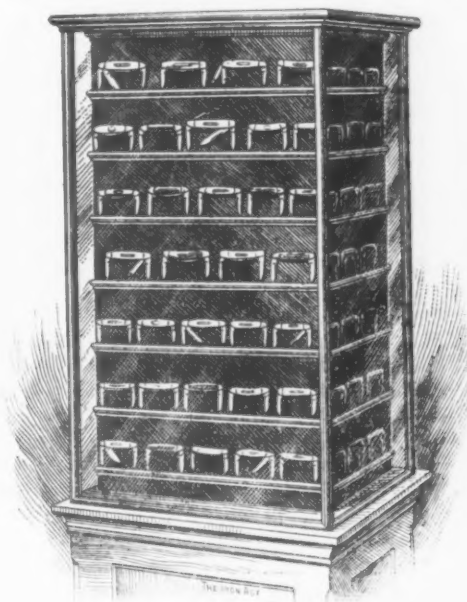
C. G. McCORD, who has been identified with the Reading Hardware Company, Reading, Penn., for nearly 20 years, spending the bulk of his time at the home office except for special trips sometimes in connection with particular contracts, is now covering territory in New England States, with permanent headquarters at the Essex Hotel, Boston, Mass., where he may be addressed as occasion offers. He will look after portions of New Hampshire, Massachusetts, Rhode Island and Connecticut.

R. HEINISCH'S SONS COMPANY, Newark, N. J., and 90 Chambers street, New York, have just gotten out for gratuitous distribution two handsome enameled metal signs in several colors to hang in a store, sample or show room. One is $13\frac{1}{2} \times 9\frac{3}{8}$ inches and the other the same width and $6\frac{1}{2}$ inches high. On each in embossed work are *fac-simile* representations of different patterns of their Tailors' Shears.

At a special meeting of the directors of the Southington Cutlery Company, Southington, Conn., held recently in New Haven, E. H. Mansfield of Boston was chosen general manager of the Southington Cutlery Company. Following the annual meeting in July last three of the directors—viz., M. C. Ogden and W. R. Walkley of New York and Charles H. Clark of Southington—were appointed a committee to engage a general manager, the result of the committee's work being ratified at the meeting referred to above. Charles D. Barnes, the present president of the company, also assumes the treasurership and Judson R. Baldwin, who for several years has been general manager, is now the secretary and superintendent. Mr. Mansfield is referred to as an experienced Hardwareman, whose services will undoubtedly be of great benefit to the company.

SIDEWALK SHOWCASE FOR KNIVES.

T. P. TERRY & SON, Ansonia, Conn., display Knives in a sidewalk showcase in the manner shown in the accompanying illustration. Inside the showcase are stood boards, one on each of the sides, which are cov-

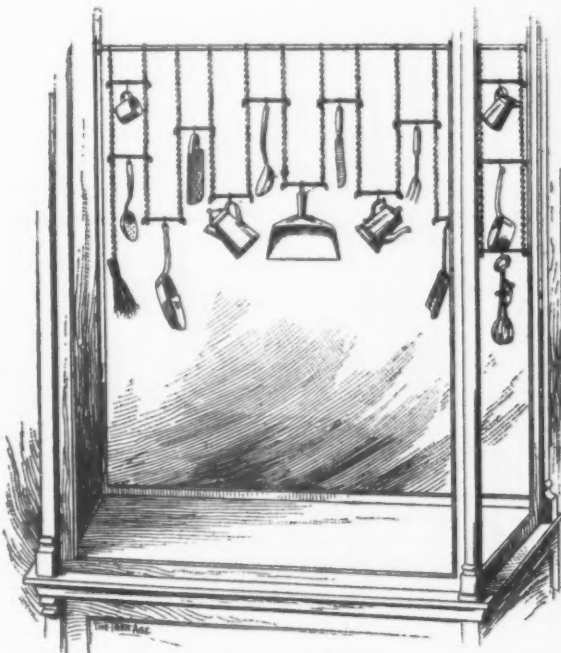


Knives in Sidewalk Showcase.

ered with black plush. On these boards are run strips of picture molding, on which are set Knives open, as illustrated. The Knives shown in this way make an attractive display and command considerable attention.

HANGING GOODS FROM CHAINS.

A RATHER unique system of displaying goods is in use in the show window of G. H. Wheeler, Seymour, Conn. From a gas pipe suspended at the top of the back of the window space are hung well chains of different lengths. These are placed 6 inches apart.



Hanging Goods from Chains.

These chains are connected, as shown in the accompanying illustration, by strips of tin turned over that have the ends bent at right angles. From these are suspended whatever goods it is desired to display at the back of the window. The idea is an excellent one and is worthy of the attention of those who wish to display goods in an unusual and attractive way.

BRITISH LETTER.

Office of *The Iron Age*, HASTINGS HOUSE,
NORFOLK ST., LONDON, W. C. {

The Week's Hardware Trade.

TRADE this week has been about average. The autumn orders are now being filled and that causes activity. In the main, prices are weakening, even though the cost of raw material remains hard, due to heavy American purchases. There is one exception. Wrought Iron Tubes have advanced 5 per cent., the result of the rise in strip. More confidence is shown in the copper market and this has had a steadying influence upon the trades affected, particularly the electrical trades. It would appear, judging by stocks, that Europe generally is short of electrical apparatus. Brass founders have been busy all week on home account, orders being mostly for Hinges, Screws, Bolts, Window Fasteners, Door Chains, Picture, Curtain and Stair Rods. Allied to this class of goods and also selling well are Fenders, Curbs, Fire Brasses and Fire Screens. A steady trade continues to be done in Gas Fittings and Water Pipes; the japanners are busy (they generally are at this time of the year), and the enameled sign plate makers are working day and night shifts. Edge Tools are in good demand, slightly above average; so also are Hurdles and Iron Fencing. American purchasers of ivory are, I think, buying a little recklessly. Ivory has advanced 5 per cent. in consequence. Sheffield consumers aver that this was unnecessary if the Americans had been a little more circumspect. The feeling is that they buy what they want regardless of cost. Since the last sales a considerable amount of ivory has come into stock. If ivory advances in price next month corresponding advances will be made by Sheffield Cutlery manufacturers.

On overseas account South American orders show distinct improvement. Orders from that region have been recently received for Galvanized Sheets, Table Lamps, Electro Plate Goods and Metallic Bedsteads. Canada has been a good customer for Tools, Sheet Iron Bedsteads and fancy goods. Orders from South Africa are for staple goods, such as Railroad Material, Kaffir Picks, Tools, Wagon Axles, Fencing Wire, Mining Implements and Machinery. Orders for ornamental and luxurious goods, formerly a marked feature of this market, are conspicuous by their absence. Rumors are rife that a new gold reef has been discovered. If this be true we may expect a South African trade boom after all. Orders from India, Burmah and the Straits Settlements include Cultivating Tools, Axles, German silver, yellow metal and railway material.

Openings in India.

I have so often referred to the growing prospects of Hardware and allied trades in India that I am glad to quote the Indian correspondent of the *Ironmonger* on two points, both of interest to American exporters. They bear out to the letter what I have written many times. The advice given to British manufacturers applies equally to Americans:

British Hardware manufacturers who rely on Indian trade to assist their business make one great mistake. They do not push their wares sufficiently by means of representatives on the spot. The Ironmongery trade—at any rate, so far as small goods are concerned—is very poorly represented in India. There are very few agents, and retail shopkeepers are at the mercy of native bazar "rings," who really command the market. Very few firms can afford to import on their own account, and the smaller retailers find it cheapest in the long run to buy from the bazar, where prices have been cut down to the lowest possible figure. Even the firms mentioned find the competition which they have to face trying, and their business would be worth very little were there not a large class of people in India which prefers the comfort and attention which it receives in a European shop to the smells and higgling which it is necessary to endure in the bazar. Manufacturing Ironmongers establishing agents, say, in Bombay, could largely increase their business. In respect of such articles as Cooking Pots, Lamps and Enameled Ware, in which there is an enormous and continuous trade, it would pay exporters and manufacturers to establish branches in India and to do the business themselves. At any rate, a Bombay representative would always earn his salary. It must

be remembered that nearly all the trade of India passes through that city.

If American makers can see their way to compete with German prices in Refrigerators India is undoubtedly a great market. On this point the Indian correspondent says:

A big trade is done in India in Refrigerators for domestic purposes. Nearly every *memsahib* has her Ice Box or Refrigerator for the keeping of meat and other perishable goods. This being the case, it is surprising that English manufacturers do not make a bolder bid for the market, for Refrigerators form a line of goods which would sell quickly and readily. At present the kind most commonly used is the zinc lined Ice Chest, an article which accomplishes its object certainly, but which has to be relegated to a dark corner on account of its unattractive exterior. There is now in the market, however, an arrangement of a much superior character, which an American concern claims the credit of having introduced. It is a nicely made piece of furniture, made of carved mahogany or other wood, according to price, containing an ice receiver at the top and galvanized iron shelves below for the reception of any article which it is desired to keep. Pipes through which the ice water circulates surround the lower compartment and in use it is very effective. The chief advantage of this Refrigerator is its pleasing appearance. It can be kept in the dining room and used for the storage of cold meat and similar foods, which are luxuries almost unknown in India. The ice receptacle is used for the cooling of drinks, and, if desired, the ice water itself, after having circulated, can be used for drinking purposes. British manufacturers would do well to take note of this and to remember that in all branches of trade appearance goes a long way in India.

Off to South Africa.

I announced some time ago that there was a movement on foot in Germany to take advantage of the situation in South Africa as soon as feasible by certain different travelers who would represent associated concerns. A large number of these gentlemen are now on their way thither, each having entered into arrangements with a group of manufacturers who offered support. Their plan is to secure a comparatively small contribution for expenses from each and they will be contented with the commission agreed upon for business actually done. English merchants are of opinion that when these travelers get to South Africa they will find themselves forestalled, and their only prospect of success depends upon the willingness of the German principals to outbid their competitors by giving longer credit. This, no doubt, they can do, but already I hear of small storekeepers overstocking themselves, and, of course, there will be many variations in price, probably downward, during the next 12 months. The tendency of the most responsible export houses in this country is to go slowly and be cautious.

The Fork Steel Controversy.

I have already referred very fully to the Sheffield Fork Steel controversy and do not propose to dilate further upon it. I merely mention for the information of readers of *The Iron Age* in America that the question is not to be allowed to rest where it now is. Prof. J. O. Arnold of the technical department of the Sheffield University College, who gave evidence at the trial, writes to deny absolutely that he ever agreed to the dogma that any mixture that will harden and temper is steel. He is about to give a lecture in which he proposes practically to demonstrate the failure of this proposition. It is also proposed to appoint a representative commission who will be asked to lay down a definition of what constitutes steel. In the lecture which Professor Arnold is about to give, on "The Properties of Cutlery Steel," he will classify chemically, mechanically and microscopically all the recognized trade products—pig iron, malleable iron, malleable cast iron and steel. The difference between malleable iron and malleable cast iron, which is not clearly understood but has a bearing upon the point in dispute, will be one of the questions the professor will discuss. I understand he is busy collecting Forks of every type made in Sheffield, and they are to be analyzed, micrographs made and the quality of the steel shown by means of lantern slides. A large number of operative cutlers and other

interested workingmen are to be asked to attend. I do not envy the professor's attempt to define steel.

A Virgin Market.

In *The Iron Age* of a recent date the announcement was made that a number of British steel rails had reached Bangkok. Great Britain, however, is not the only country casting envious glances upon Siam. Any student of Eastern economics will agree that Siam is a virgin market, with potentially a very great commerce in the future. In this connection I may mention that a ship has just been chartered to convey a large cargo of steel rails from Hamburg to Bangkok, and the opportunity is being utilized by German manufacturers in other branches of industry to convey to Siam consignments of goods which, in the ordinary way, could only reach their destination by transshipment at Singapore. I have been looking up the particulars of the imports of Siam. I find that the imports of Hardware and Cutlery increased by considerably over \$100,000. Of these imports 44 per cent. is credited to Germany, 21 per cent. to Great Britain, 1 8per cent. to Singapore and 9½ per cent. to Hong Kong and China. The purchases of other metal goods, such as steel, iron and machinery, largely increased last year, the import rising from \$850,000 to \$1,230,000. This last figure was made up as follows:

Articles.	Value.	Total.
Iron: Bar, Angle, Bolt and Rod.....	\$52,645	
Sheets and Plates.....	96,310	
Wire, Wire Rope and Cable.....	56,260	
Cast and manufactures thereof.....	43,135	
Wrought and manufactures thereof.....	318,290	
	\$566,640	
Steel: Bars and Plates.....	43,725	
Manufactures of, unenumerated.....	48,455	
		92,180
Machinery and parts thereof.....		575,850
The approximate shares of the various countries trading in metals is as follows:		

Country.	Percentage.	
	1900.	1901.
Germany	9.60	37.30
United Kingdom.....	46.40	33.60
Singapore.....	31.20	20.70
United States.....	5.10	2.60
China	1.90	1.10
Hong Kong.....	1.70	0.60
Other countries.....	4.10	4.10
Totals.....	100.00	100.00

It will thus be seen that Germany has been making great progress at the expense of Great Britain and the United States. A little later, when American makers can find time to export goods, they should watch this market. Bangkok is one of the coming ports of that part of the world.

American Agricultural Machinery in Russian Poland.

One of the districts of Europe which I have consistently watched and reported upon is that of Russian Poland. A few months ago I mentioned the demand in that district for Agricultural Implements and recommended American manufacturers to cultivate the official elements out there. I am therefore not a little interested to read in the report of a Warsaw correspondent to *Commercial Intelligence* that a group of rich American manufacturers of Agricultural Machinery petitioned the Russian Government to grant them the privilege of supplying Agricultural Machinery and Implements to the poorer class of farmers. They were willing to accept payments in long installments against the guarantee of the Government for the accounts opened by them. They proposed to erect factories in the chief centers of Russia as well as warehouses in the principal towns, which would supply practically everything that might be needed by the agricultural classes. Their petition was, however, unfavorably received by the Government and the matter dropped. There is, notwithstanding, an enormous outlet for Agricultural Machinery in that country, and there is good reason for believing that if a British firm or firms interested themselves in forming a Polish or Russian company for the manufacture of such machinery in that country their efforts would meet with success. Material and labor are very cheap in that country, and it is only lack of enterprise, and consequently of capital, on the part of the home manufacturers that retard development of this industry. In spite of the heavy

charges and duty Agricultural Machinery and Implements are being imported in increasing quantities from America, Germany and in a less degree from England.

German Competition in Machines and Tools.

I have been reading a report on the effects of the serious German depression which became so acute toward the end of last year. During the past two years German competition has rather fallen out of public sight, but it is none the less real on that account. One of the points always to be remembered in connection with trade matters is that surface appearances more readily catch the eye when the current is disturbed. There may be a strong, steady current deep down, never calling attention to itself, and yet a very real factor in the world's commercial currents. This is, to some extent, the case with Germany, and as a matter of fact the trade depression last year necessitated the unloading upon foreign markets of an immense quantity of material which otherwise would have been held for better prices. After all it is quantity that tells the tale, and I have therefore extracted some particulars as to German imports and exports of various articles in metric centners. I may explain that 1 metric centner is equal to 220 pounds:

Articles.	Imports.	Exports.
	Met. centners.	Met. centners.
Lead and Leaden goods.....	532,668	392,119
Brushes and Sieve goods.....	11,391	21,206
Iron and Iron goods.....	4,006,569	23,472,410
Instruments, Machines, Vehicles.....	1,077,131	2,894,132
Copper and Copper goods.....	734,494	598,736
Hardware, &c.....	8,996	402,739
Zinc and Zinc goods.....	217,431	730,102
Tin and Tinware.....	130,159	34,049

It will be noticed that the exports of Iron and Iron goods, of Hardware and of Zinc goods enormously exceeded in quantity the imports. But I started this paragraph with the intention of giving particulars of the German exports of machines and machine tools. Take, for example, the trade done by Germany in this line of manufacture with France, Austria-Hungary and Russia, and it will at once be seen what an enormous expansion in the trade has taken place in ten years:

	Value in Thousand Marks.		
	France.	Austria-Hungary.	Russia.
1891.....	7,622	10,585	9,088
1892.....	6,534	10,581	8,095
1893.....	6,715	10,498	8,424
1894.....	8,068	13,844	15,710
1895.....	8,600	14,751	21,499
1896.....	9,197	14,717	31,880
1897.....	10,318	15,009	33,176
1898.....	10,601	17,357	40,184
1899.....	13,671	19,515	57,864
1900.....	25,345	24,228	50,914

Readers will particularly note the greatly increased purchases by Russia. The details of these machines and their percentage is as follows:

Articles.	Value in thousand marks.	Per cent. of total export
Various industrial machines.....	80,620	35.2
Electrical machines.....	23,252	10.2
Sewing machines of all kinds.....	20,347	8.9
Steam engines.....	19,400	8.5
Locomotives and locomobles.....	15,716	6.9
Agricultural machines.....	12,995	5.7
Tool machines.....	7,877	3.4
Mill machines.....	6,107	2.7
Weaving machines.....	5,668	2.5
Cotton mill machines.....	5,365	2.3
Pumps	5,138	2.2

IDEAL HAND BOOK NO. 15.

THE IDEAL MFG. COMPANY, New Haven, Conn., have issued their No. 15 "Book of Useful Information For Shooters." Much of the matter has been revised and rewritten, including tables relating to primers, powder, velocity, penetration and trajectory of Bullets; matter relative to resizing and reloading and crimping Paper Shells &c. Illustrations and descriptions are given of new Tools and Machines, also of new Bullets which have been made since the issue of book No. 14.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

The Woods-Harris Iron & Supply Company, temporary office 229 Second street, Memphis, Tenn., have organized and will open up for business November 1 as jobbers and wholesale dealers in Iron, Steel, Metals, mill and shop supplies, Wagon and Carriage Wood Stock, Trimmings and Hardware. The company commence buying goods October 1 and request manufacturers to send them catalogues, stock sheets, prices, &c.

F. K. Dixon has just opened a store in the new Hayne Building at Martin's Ferry, Ohio. Mr. Dixon will handle Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, &c., concerning which he would value catalogues and price-lists from manufacturers.

The Geo. W. Peck Company, who have seven stores in as many different towns in New York State, advise us that they would be pleased to have manufacturers send to their Dansville establishment catalogues, price-lists and discount sheets relating to their lines, which embrace Hardware, Stoves, Paints, Oils, Glass, Harness, Plumbing, Vehicles, Sash, Doors, Blinds, &c. About a year since they suffered a very disastrous fire at Dansville, in which most of their catalogues were consumed, and since that time they have been quite destitute in this respect.

SMITH & HEMENWAY COMPANY'S NEW CATALOGUE.

THE SMITH & HEMENWAY COMPANY, 298 Broadway, New York, have just issued the fourth edition of their "Green Book of Hardware Specialties," containing the large assortment of goods manufactured by themselves and the Utica Drop Forge & Tool Company, Utica, N. Y., the entire product of the latter



Catalogue Page Border (Reduced).

concern being marketed by the Smith & Hemenway Company. In the 144 pages, each 10 x 7 inches, printed on a tint of green paper, are shown in great variety Pliers and Cutting Nippers for almost every purpose, Scissors, Razors, Shaving Sets, Shoe Knives, Paper Hangers and Glaziers' Tools, Nail Pullers, Ball Bearing Casters, together with a large assortment of Mechanics' Tools, Hardware Specialties and novel devices. On each page is a unique border in orange, which is reproduced herewith, and throughout the book at suitable intervals are a number of pictorial illustrations designed graphically to bring out particular points.

THE Barb Wire department of the Oliver plant of the American Steel & Wire Company, Pittsburgh, Pa., was destroyed by fire on the night of the 19th ult. The fire

was due to the explosion of a lantern in the hands of the night watchman. The loss is estimated at \$150,000. The Rod and Wire Nail departments of the plant were saved. The Barb Wire factory will be rebuilt at once.

THE ALLERTON-CLARKE COMPANY, 97 Chambers street, New York and Chicago, have recently been appointed the general selling agents of the Allright Mfg. Company, Cleveland, Ohio, who manufacture gas Hot Plates, Heaters and Radiators in large variety. The company also make Nail Boxes, Lawn Sprinklers and other specialties.

AMONG THE HARDWARE TRADE.

John H. Newman has purchased the Hardware, Stove, Farm Implement and Sporting Goods business of W. J. Carter in Amity, Col.

The Montana Hardware Company, Butte, Mont., have purchased the entire stock of the Bee Hive Company of that city, consisting of Hardware, House Furnishing Goods, Wood and Willow Ware, Tin and Granite Ware, Queensware and Crockery. The company expect to materially increase their business, which is both wholesale and retail, the line handled covering Mining and Milling Machinery, Steam Boilers and Engines, Heavy Hardware, Light and Builders' Hardware, &c.

F. E. Robinson has lately opened a retail store in Sebastopol, Cal., carrying a line embracing Shelf Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods and furniture.

E. L. Mullin, Hardware merchant, Bunker Hill, Ind., has purchased a lot adjoining his store and next summer expects to move his present establishment to the rear and erect a new brick structure with 40 feet frontage.

The firm of Simpson & Mitchell, Hurleyville, N. Y., have dissolved partnership, Mr. Simpson retiring. Andrew Mitchell will continue the business under his own name. Mr. Mitchell has doubled the stock formerly carried. His line embraces general Hardware, Stoves and Ranges, Tinware, Farm Implements, Paints and Oils, &c. He also manufactures a line of Tinware, Pumps and Iron Pipe.

Schweedhelm & Winter have purchased the Hardware, Stove, Sporting Goods and Paint and Oil business of O. D. Bassinger, Bancroft, Neb.

L. D. Smith has engaged in the retail Hardware, Stove, Tinware, Sporting Goods and furniture business in Stephens, Ark.

J. W. Wright has bought a Hardware store at Lake View, Iowa, and will continue the business, handling both Shelf and Heavy Hardware, Stoves and Tinware, Sporting Goods, &c.

Wernli-Boardman Company have succeeded B. M. Wernli in the Hardware, Stove, Agricultural Implement and Sporting Goods business in Encampment, Wyo. The company have also added a line of groceries, dry goods and men's furnishings. Their store is a double one, comprising two stories and basement.

The Interior Mercantile Company, Canyon City, Ore., have been incorporated with a capital stock of \$10,000. The new company commenced business October 1, handling a line comprising Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Sporting Goods, &c., at wholesale and retail. C. S. Broadwell, formerly of Portland, will manage the business.

D. A. Hasbrouck's Hardware store at New Paltz, N. Y., was completely destroyed by fire a short time since. The fire was caused by explosion of gasoline in an adjoining building. Mr. Hasbrouck is rebuilding and will carry on the business as heretofore.

T. J. Alspaugh has purchased J. H. Anglin's interest in the Hardware business of Anglin & Leonard, Silver Lake, Ind., and the firm name is now Leonard & Alspaugh. The firm are just moving into a new building erected especially for the Hardware and Implement business. It is 22 x 130 feet, two stories high.

Dye & Higgins have succeeded Dye & Benjamin in the Shelf and Heavy Hardware and general merchandise business in Lone Wolf, O. T. They are intending to build a new iron clad store 50 x 80 feet in dimensions.

Wm. A. Harper has purchased the Stove, Tinware and House Furnishing Goods business of I. F. Thompson, Longmont, Col., and will continue at the old stand.

Hubbell & Staples have lately opened up in the Hardware business in Norwalk, Conn.

Lewis & Qualls have succeeded Conley & Qualls in the Hardware, Farm Implement, Stove and Sporting Goods business in Llano, Texas. The capital of the firm has been increased \$2500.

Kremer & Walter have succeeded J. M. Kremer & Co. in the Hardware, Stove, Sporting Goods and furniture and undertaking business in Norway, Iowa. The reorganized firm have moved into a new building.

Copeland & Mitchell's Heavy Hardware and Farming Implement stock at San Angelo, Texas, was destroyed by fire a short time since, the loss being in the neighborhood of \$15,000. The firm will rebuild, with machine shop, carriage building and general repair shop in connection.

E. W. Dean, Fullerton, Cal., has admitted J. C. Braly, Jr., formerly of Pasadena, to partnership and the style has become Dean & Braly. The firm contemplate remodeling their main storeroom by taking out an inside stairway and putting in a large balcony. The store building is brick, 25 x 80 feet, two stories and basement, with elevator. In the rear is a plumbing and Bicycle shop 40 feet square and warehouse 18 x 48 feet. Two new 6-foot oak floor showcases have recently been installed.

MISCELLANEOUS NOTES.

New Sizes of Fine Mechanical Tools.

In addition to the many new fine mechanical tools made by the L. S. Starrett Company, Athol, Mass., and 123 Liberty street, New York, are some larger sizes of various articles shown in their complete catalogue No. 16. In the way of hardened squares No. 20, as illustrated on page 22, are three new ones with blades 15, 18

New Styles of Builders' Hardware.

The Reading Hardware Company, Reading, Pa., who have always made a large line of cast iron bolts, &c., of various kinds, are now putting on the market lines of wrought goods, such as wrought steel square and spring bolts and other bolts of the same general character in wrought metal, wrought steel back flaps, wrought steel mortise knob locks, together with a number of new articles in builders' hardware, illustrated and described in 26 extra pages now being sent out to be pasted in their regular catalogue. Among the types of articles so shown are showcase hooks, hat rack and ceiling hooks, a number of new locks and escutcheons, turn knobs, sash fasteners, door knockers, sliding door latches and the Ogden liquid door check and spring, which they now own and manufacture. In order to provide room for these and other new goods contemplated they have erected a new building about 150 x 50 feet, five stories high, and plans are about ready for a new foundry building which will very much increase their capacity.

The Disston Machinists' Square.

Henry Disston & Sons, Philadelphia, Pa., are offering a machinists' steel square, catalogued as No. 20, to meet the demand for a moderate priced tool of this character. It is referred to as being of the best quality of material and accurate in finish.

The Mallory Improved Shutter Worker.

The Mallory Mfg. Company, Flemington, N. J., are now manufacturing the working parts of their shutter worker of drop steel forgings, which permits the turning out of the parts much more rapidly than heretofore by eliminating a large amount of hand work which was necessary on the malleable iron parts, while the steel forgings are more durable. The shutter worker is attached to outside blinds and operated by a crank handle inside the house. In attaching the device a 1/2-inch hole is bored through the window casing for the rod which connects the handle with worker, thus permitting the use of the attachment on old as well as new houses. The device does not interfere with sash weights. The blinds may be opened little or much, according to requirements, and the blinds are firmly held in any position. The use of the device prevents slamming and breaking and permits the blinds to be opened or closed without raising the window.

Ribbed Hockey Skate.

Barney & Berry, Springfield, Mass., are now making all their high grade ice skates, both regular and special fastenings, with ribbed runners, of which the illustration represents a type, in addition to the regular blade.



Ribbed Hockey Skate.

and 24 inches long. The No. 425 pocket slide caliper is now made in a 5-inch size, the style of which is shown on page 22. Firm point calipers No. 26, page 75, same catalogue, are now obtainable in 30 and 36 inch sizes, calipering 38 and 46 inch diameters respectively. Similar additions have been made to the line of screw adjusting calipers, No. 34, on page 80, 30 and 36 inch lengths and capacities of 38 and 46 inches. In micrometer calipers two have been added having a capacity of 1/2 inch, both recording by ten thousandths. No. 218 has ratchet stop or speeded screw thumb piece, without lock nut. No. 219, of the same capacity and same reading, is made with lock nut and ratchet stop or speeded screw thumb piece.

The ribbed hockey skate here shown is made in grade 3, polished and nicked, in all sizes from 9 to 12 inches, rising by 1/2 inch, and can be furnished with either the heel button, all clamp, American Rink, Ice King or F. fastening in place of the hockey fastening here illustrated. When intended for ladies' use the skate is assembled with narrow foot plates and small heels. This form of blade enhances the appearance and salability of the skate, as well as lightening the weight of the runner without impairing its efficiency. A large stock of this well-known line of skates is carried by Walter B. Stevens & Son, 114 Chambers street, New York, who represent Barney & Berry in New York and nearby territory.

The U. S. Barn Door Hanger and Stay Roller.

The Griffin Mfg. Company, Erie, Pa., are putting on the market the rigid barn door hanger and the stay roller shown in the accompanying cuts. The frame of the hanger, which is referred to as being very heavy, has

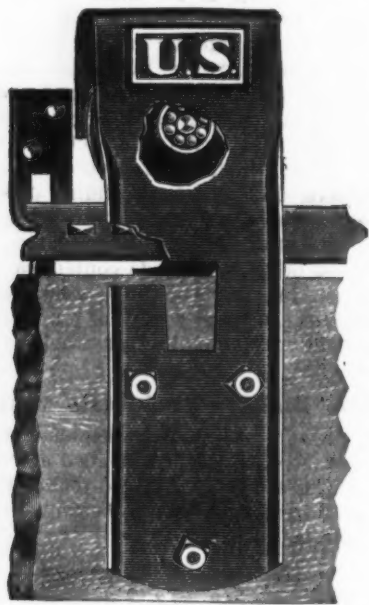


Fig. 1.—The U. S. Barn Door Hanger.

a lug turned which answers the purpose of a guide for fastening the hanger to the door and also for preventing the wheel jumping off the track. The wheel, it is remarked, being accurately turned and bored and having full roller bearings is anti-friction on any length of track.

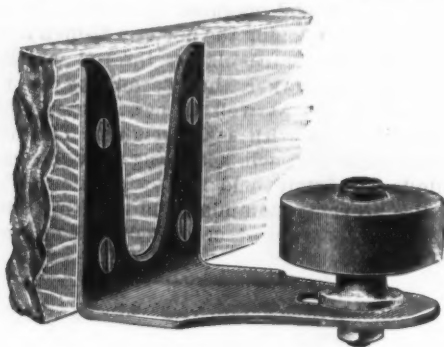
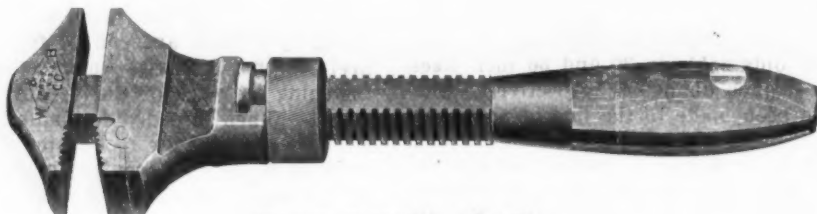


Fig. 2.—The U. S. Stay Roller.

It is explained that the hangers are usually sold with the company's American track, but can be used equally as well with any of the steel tracks on the market. The U. S. stay roller is illustrated in Fig. 2.

W. & B. Nut and Pipe Wrench.

The Whitman & Barnes Mfg. Company, Akron, Ohio, and 111 Chambers street, New York, are just putting on the market the W. & B. combination nut and pipe wrench here illustrated. In it are combined the characteristics of a knife handle machinists' wrench and pipe wrench. It has a jaw on a pivot which enables the mechanic to engage or release the pipe without difficulty.



W. & B. Combination Wrench.

It is also said by the makers to do away with certain features in combination wrenches which compel the use of a large nut or a separate wrench to complete the

operation of engaging the pipe. The pipe jaws will engage and release the same as the ordinary pipe wrench. The tool is made of crucible steel, bright finish, in 10, 12 and 15 inch lengths, and we are advised the material, workmanship and finish are of the very best. The sizes named will take $\frac{1}{4}$ to 1 inch, $\frac{1}{2}$ to $1\frac{1}{4}$ inches and $\frac{1}{2}$ to $2\frac{1}{4}$ inches, respectively, outside diameters of wire, pipe or rods.

Universal Test Indicator.

The L. S. Starrett Company, Athol, Mass., and 123 Liberty street, New York, are now introducing a recent addition to their large line of mechanical tools in the form of a Universal test indicator, No. 64, as here shown. Its purpose is to test and show the imperfections or degrees of exactness of inside, outside or surface work, errors often occurring through vibration of machinery

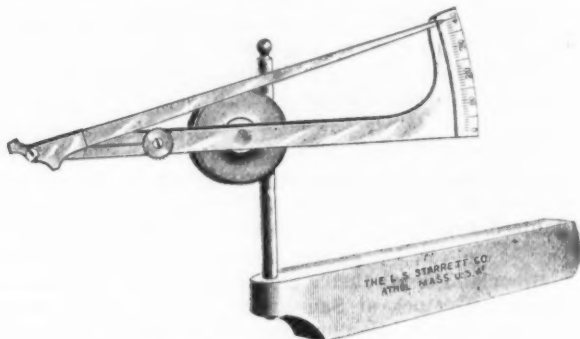


Fig. 1.—Universal Test Indicator No. 64.

or fault of lathe, &c. It can be instantly attached to the spindle or to the needle of any surface gauge and used in connection with it to show the slightest variation in thousandths. It may be clamped to a flat or round support varying in size from a surface gauge needle up to $\frac{3}{8}$ inch diameter, flat or round. A special holder, as here shown, is designed to go in the tool post of a lathe, adapting it for use to show the accuracy of all kinds of lathe work turning, chucking or locating and centering work on face plate. The head of the needle has three working points, equidistant from its fulcrum, so the

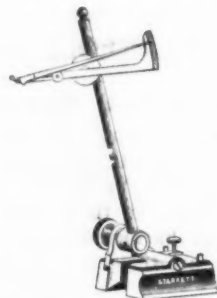


Fig. 2.—Same Indicator Applied to Surface Gauge.

telltale needle will vibrate, reading in thousandths, when the work contacts with either point—in front, above or below it. When in front the spring operating the telltale needle needs to be reversed to throw the point of the needle up instead of down, as when used above or below the work. This is accomplished instantly by a slight turn of the milled disk to which the vibratory spring is attached. The working parts of the head are hardened and as a surface or test gauge for accurate

work it is especially recommended by the manufacturers. Fig. 2 shows the indicator as attached to one of their newer surface gauges.

Doll Carriage No. A70

The Arcade Mfg. Company, Freeport, Ill., have added to their line of toys the doll carriage illustrated herewith. It is made of flat steel wire, finished in bright enamel, the wheels being bright red, the seat white and the frame blue. The extreme height is 23 inches, width 8



Doll Carriage No. A70.

inches, length 15 inches. The diameter of the rear wheels is 6 inches and that of the front wheels 4 inches. The carriage is referred to as being well made, strong and durable and very attractive. It is supplied with or without canopy top.

Taplin's Improved Beaters.

The accompanying cuts represent two improved beaters put on the market by the Taplin Mfg. Company, New Britain, Conn., New York office 90 Chambers street. In

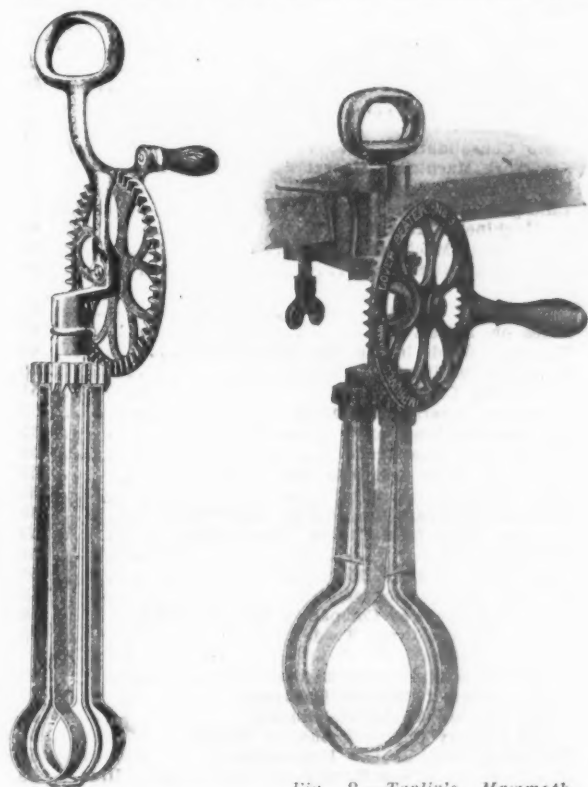


Fig. 1.—Taplin's Improved Dover Beater and Mixer No. 300.

Fig. 1 is shown an egg beater or whip for beating eggs or mixing any liquids in a tumbler. The agitators have a spread of something less than 2 inches at the bottom to permit the use of the beater in the smallest tumbler.

The beater is long enough to use in the longest soda water glass, and is furnished in regular and electro-tinned finish. In Fig. 2 is illustrated the Mammoth beater and mixer, which measures in length 15 $\frac{1}{4}$ inches over all. It is designed for use by hotels, confectioners, caterers, bakers, &c. It is explained that the beater will mix with the greatest ease eggs, flour, batters, melted sugars, syrups, &c., in large quantities. The beater can be instantly removed from the clamp. A feature in manufacture to which attention is called is that the agitators are retinned while in motion after the parts have been assembled. The top of the beater is well finished.

Hard Wire Fence Stays.

The Coming Fence Company, Racine, Wis., are offering the hard wire fence stays shown in Fig. 1. No. 1 illustrates two stays, with a part cut away in the middle, made of No. 10 hard wire. No. 2 shows two stays extending between the top and second wire of a fence, also the upper part of two stays extending down to a third wire. No. 3 shows a bottom wire, also the method of locking at the bottom of a fence. The stays are fur-

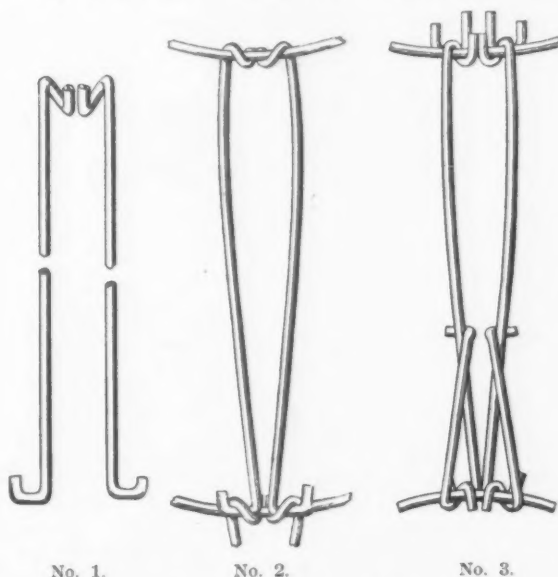


Fig. 1.—Hard Wire Fence Stays.

nished in seven lengths, from 3 to 12 inches, in bundles, and are as easily handled, it is remarked, as nails. The stays are woven in the field by hand, without machine or tools, after the number of strand wires have been stretched any distance apart to meet the requirements for horses, cattle, sheep or hogs. The strand wires for such a fence consist of plain hard wire or barb wire, or both in combination, as shown in Fig. 2. The stays

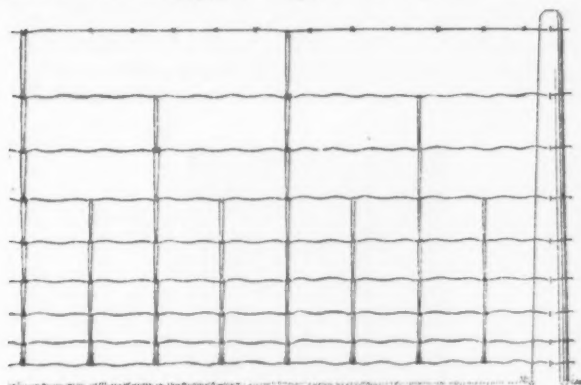
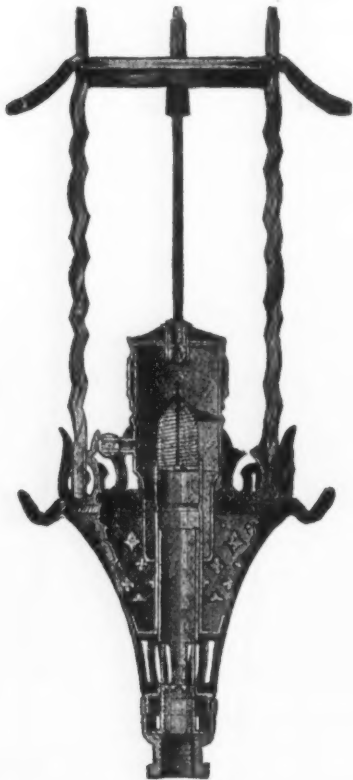


Fig. 2.—The Use of Stays on Fence.

may be placed close together or further apart, as the case demands, and if it is desirable to change them afterward it may be done by taking out stays or putting in additional ones. The stays are used in pairs and make a very stiff fence, it is stated, as they support the strands or lateral wires from top to bottom, and small animals undertaking to get under must lift the entire fence. The stays, it is explained, are adapted to new or old fencing.

The Lindsay Vibration Burner.

Lindsay & Co., 170 Lake street, Chicago, Ill., are offering the vibration incandescent gas burner shown in the accompanying sectional cut. The spring is located within the central tube to remove it from the heat of the flame, and it is also further protected by a non-heat conducting cap. By this arrangement, it is remarked, the spring never loses its flexibility through the action of

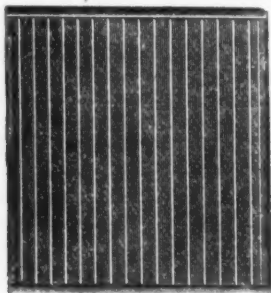


The Lindsay Vibration Burner.

the heat. The center guide rod, it is explained, acts not only as a guide to retain the spring in position but also because of its flexibility constitutes a spring to cushion lateral shocks received by the lamp. The burner is equipped with an improved pivot adjustment for regulating the flow of gas. It is stated that by the use of this adjustment the trouble of blackened mantles is entirely obviated and a proper proportion of air and gas secured. It is pointed out that these features provide a satisfactory vibration burner.

The Clark Crispy Toaster.

The toaster shown herewith consists of a smooth iron base, upon which are secured a series of parallel wires which prevent, it is explained, the burning of the article



The Clark Crispy Toaster.

being toasted. The toaster, it is remarked, will toast to a nice crisp brown, without drying the bread inside, using a small amount of fuel and requiring little attention. The toaster may also be used for toasting rusk, rolls, &c., and is offered by the J. L. Clark Hardware Company, Rockford, Ill.

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